DRAFT AUGUST 2008

AIR FORCE AMMUNITION AND EXPLOSIVES STORAGE & UNACCOMPANIED PERSONNEL HOUSING DURING THE COLD WAR (1946-1989)

SITE REPORT: KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO

PREPARED FOR:

UNITED STATES AIR FORCE CENTER FOR
ENVIRONMENTAL EXCELLENCE
BROOKS CITY-BASE, TEXAS 78235-5112

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Draft

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August 2008

for

United State Air Force Center for Environmental Excellence
Brooks City-Base, Texas 78235-5112

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

This study was prepared by the Department of the Air Force to meet the compliance requirement associated with the *Program Comment for World War II and Cold War Era (1939-1974) Ammunition Storage Facilities* and *Program Comment for Cold War Era (1946-1974) Unaccompanied Personnel Housing*, issued by the Advisory Council on Historic Preservation on August 18, 2006. A programmatic treatment for the properties was developed in compliance with Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, to take into consideration the effects of future management activities upon this class of Air Force resources constructed between 1939 and 1974, which might be historic.

Under 36 CFR 800.14(e) of the Advisory Council on Historic Preservation's regulations, the Air Force sought to develop an integrated and cost-effective approach to NHPA requirements that are consistent with the Air Force's need to provide munitions and ordnance in a rapidly changing and complex military environment. The programmatic treatment includes the preparation of nationwide historic contexts on ammunition storage facilities and unaccompanied personnel housing constructed or modified during the Cold War Era and site visits to six Cold War era installations with representative examples of each building type. Currently, the Air Force inventory includes over 1,600 facilities classified as ammunition storage, and over 1,100 facilities associated with unaccompanied personnel housing that were constructed between 1946 and 1989.

The current project provides documentation of an Air Force Base constructed during World War II for the U.S. Army Air Forces (AAF) and operated by the Air Force throughout the Cold War Era, Kirtland Air Force Base, Albuquerque, New Mexico (Plate 1). Kirtland Air Force Base was selected for documentation for two reasons. First, as one of the first National Stockpile Sites, the Manzano Base area of Kirtland required specialized facilities for the storage and maintenance of atomic weapons. An additional reason for selecting this base, was the presence of a large number of enlisted personnel dormitories and officers' quarters constructed during the 1950s (United States Air Force Real Property Inventory 2005). This study investigates the construction of the installation and documents representative examples of types of ammunition storage facilities and unaccompanied personnel housing. It also reviews new designs for these facilities created during the Cold War. R. Christopher Goodwin & Associates, Inc., completed the current project on behalf of the United States Air Force Center for Environmental Excellence (AFCEE) through the United States Army Medical Research Acquisition Activity (USAMRAA).

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1.2 Background

The surrender of Japan on 2 September 1945 marked the end of hostilities in World War II and presented the U.S. military with the challenge of managing the conversion of real property constructed to support nationwide mobilization to support of a peacetime military. During the preceding six years, the Federal Government expended hundreds of millions of dollars in constructing new military industrial facilities and major ordnance depots. Ammunition plants, armor plate factories, vehicle assembly lines, and gun manufactories once needed to support the global war were now excess property. Numerous facilities were closed while others were placed in lay-away status should they be needed in the future. The tremendous amounts of ordnance and raw materials no longer needed for munitions production were transferred to storage depots or destroyed. Activity at Army and Navy ammunition depots declined, but none were closed due to the continued need to store ammunition.

Post-war planning for the military began as early as 1941. Military planners addressed two issues: the size of the regular armed forces and the size and role of the air forces. Historically, the military demobilized during peacetime. The same pattern was true after World War II. A smaller Army supported by a large reserve system was preferred because such a system "was considered more in accordance with the democratic citizen-soldier concept" (Brayton 1972:139).

The creation of an independent air branch resulted from a struggle within the Army between those who wanted to retain control of air units, and the AAF that advocated the creation of an independent service. Central to this debate was the military role of aviation. The AAF strove to build a strong and compelling case for the creation of an independent air branch. The value of strategic bombing was key in the argument for the creation of an independent service. AAF headquarters staff advocated strategic bombing, believing that future wars would be destructive and brief, and would be decided quickly through the use of superior air power. In 1944, the AAF produced a report titled "Initial Plan for the Post-War Air Force" which reflected this strategic air power position. The report advocated the creation of a one million strong, peacetime active-duty air force with major responsibility for U.S. security with little support from the Army and Navy (Gross 1985a:70).

Three legislative initiatives impacted the creation of an independent air branch of the military. Congressional actions addressed the structure of defense forces, the organizational framework of various branches of the military, and the reallocation of aviation assets and

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personnel. The legislation included the National Security Act of 1947, the Army and Air Force Authorization Act of 1949, and the Air Force Organization Act of 1951.

Following a heated debate between the Army and the Army Air Forces, the National Security Act of 1947 was ratified on 26 July 1947 and became Public Law 253. The Act established the United States Air Force as a separate service within the armed forces. The purpose of the Act was to "provide a comprehensive program for the future security of the United States" and to "provide for the establishment of integrated policies and procedures for the departments," among other functions (United States Congress 1947).

The Act established three departments within the National Military Establishment: the Department of the Army, the Department of the Navy, and the Department of the Air Force. Each department had its own secretary. Under the legislation, the President appointed the civilian secretaries of each department. The first Secretary of the Air Force was W. Stuart Symington, who previously served as the Assistant Secretary of War for Air. The legislation stipulated that functions of the Secretary or the Department of the Army, including those assigned to or under the authority of the Commanding General, AAF, and those deemed by the Secretary of Defense to be necessary or desirable for the operation or administration of the Air Force, were transferred to the Department of the Air Force (Air University 1955:57). The act directed that all transfers occur within two years. All AAF and Air Corps units and personnel were transferred to the USAF.

The National Security Act of 1947 transferred all property, records, installations, agencies, activities, projects, and civilian personnel under the jurisdiction, control, authority, or command from the Commanding General of the AAF to the Chief of Staff, USAF, in the Department of the Air Force. The newly created Air Force assumed control of several installations constructed by the Army including numerous ammunition storage facilities. The Air Force currently manages 194 facilities constructed before 1946. The transfer of personnel and functions was completed through a series of Transfer Orders; Army-Air Force agreements that were submitted to the Secretary of Defense. The transfer agreements separated the Air Force from the Army, and established unification measures and procedures. One such agreement designated the Army Chief of Engineers as the construction contracting agent for both services. The Chief of Engineers also had oversight over real estate transactions for both departments. Through amendments to the National Security Act enacted in 1949, the National Military Establishment was renamed the Department of Defense (Air University 1955:59).

Although the National Security Act of 1947 established the USAF, the legislation provided no statutory authority for USAF operation. The USAF obtained its statutory authority

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through a law pertaining to the Army. The Army and Air Force Authorization Act of 1949 sought to address shortcomings in the National Security Act. Title II of the Act addressed the USAF. Under the act, the USAF comprised the regular Air Force, the ANG of the U.S., the Air National Guard while in service of the U.S., and the U.S. Air Force Reserve. The law also stipulated force size for the U.S. Air Force Reserve and the ANG (Air University 1955:65).

The third piece of legislation that directly affected the early organization of the USAF was the Air Force Organization Act of 1951. This legislation provided the statutory framework for the internal organization of the USAF (Air University 1955:66). It codified organizational and management policies through administrative action. Section 302 of Title III of the act defined the regular air forces, and specified who should be considered a member of the regular Air Force (Air University 1955:69). The ANG and the U.S. Air Force Reserve were discussed in Sections 303 and 304 of Title III of the act. Units, organizations, and personnel of the Air National Guard "for which federal responsibility had been invested by law in the Secretary of the Air Force or the Department of the Air Force" were addressed (Air University 1955:69). Three major air commands were created within the USAF under Section 308 of Article III, including the Air Defense Command (ADC), Strategic Air Command (SAC), and Tactical Air Command (TAC). The legislation prohibited the alteration and consolidation of these commands without Congressional action except during times of war or national emergency as declared by the President or Congress (*Air Reserve Forces Review Magazine* November 1951:10). In addition, two staff positions were created to address issues concerning reserve components.

The legislation also codified the internal organization of the USAF. The Air Staff was established and organized under the legislation. The Air Staff comprised the Chief of Staff and the Vice Chief of Staff. The Secretary of the Department of the Air Force was authorized to retain military and civilian personnel as necessary. The Chief of Staff was given command over the major commands. The Air Force Organization Act completed the process of creating and organizing a separate and distinct branch of the military (Air University 1955:70).

The newly-created Air Force relied heavily on the U.S. Army Corps of Engineers for most of its early design and construction projects. As a result, many of the facilities constructed at Air Force bases are similar to those constructed for the Army. Exceptions to this are found primarily in facilities constructed for the storage and maintenance of atomic weapons. As the military branch with the greatest responsibility for the nation's nuclear stockpile, specialized buildings for storage and maintenance were needed. The earliest atomic weapons required frequent maintenance and a complex assemblage of buildings were constructed to meet this need.

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As atomic weapons became more sophisticated, many of the original buildings were no longer needed, and new facilities were constructed for each generation of nuclear weapon.

During the late 1950s weapons technology became increasingly sophisticated. The perfection of extremely powerful explosives limited the amount of ammunition that was allowed to be stored in a single building. This created the need for enhanced logistical support at both depots and smaller installations. Guided missiles and large rockets began to replace the gravity bombs and machine guns that were the mainstay of munitions for the armed forces for the first half of the twentieth century. Ammunition storage facilities constructed during World War II, an era when most munitions were manually moved into and out of magazines, were used for the storage of these new and larger weapons. Forklifts and cranes replaced hand trucks and dollies in the movement of ammunition, and specialized lifting devices were developed to safely maneuver large missiles through the three-foot wide door of a standard igloo.

Large-scale construction of new ammunition storage facilities at Air Force bases was sharply curtailed after 1960; however, specialized buildings were erected to serve mission-based storage and maintenance. Many of these new buildings were constructed for a particular weapons system, and heavily modified when a particular weapon was removed from service. When new buildings were required, designs were characterized by uniformity, standardization in materials, and a lack of ornamentation. The critical criterion for new construction was safety—buildings generally were constructed of reinforced concrete in response to safety concerns.

Technical guidance on the handling and storage of ammunition and explosives was typically formulated through coordination with all three military branches and applied throughout the Department of Defense. As with many aspects of munitions storage, the Department of the Air Force adhered to regulations established by the Army Ordnance Corps and relied on the Army Corps of Engineers for its design and construction. With the exception of special weapons, there were no prescribed regulations on what types of weapons were stored in a particular facility. Generally, finished ammunition, such as small arms ammunition or gravity bombs, were stored in aboveground magazines governed by quantity and distance standards. Guided missiles, bulk high explosives, detonators and fuzes, or propellants were stored in earth-covered magazines. At the installation level, these same types of munitions were stored in smaller, aboveground, concrete or structural tile magazines near combat training ranges. Larger installations often had segregated yards for storing additional quantities of ammunition that were transported to training areas as needed. These ammunition storage areas were never used for the long-term storage of large quantities of ammunition, and only served the immediate needs of the installation.

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The threat of nuclear retaliation was widely held as an effective military deterrent during the Cold War-period. A large conventional military force, therefore, was thought to be unnecessary. The Air Force successfully argued for increased Federal appropriations as the only service with the capacity to deliver nuclear weapons, to the detriment of the Navy and Army budgets. This resulted in considerable construction activity for the Air Force when compared to other military branches.

Much of the policy guiding the construction of unaccompanied personnel housing was applied universally to all branches of the military. Congressional actions established maximum cost per person and allocated square footage based on personnel rank. Many of the improvements to UPH were prompted by requests from one branch of the military to increase cost per man, for example, that were later applied throughout the Department of Defense. Installation specific exemptions were granted. In areas with high construction costs, Congress could increase the cost ceiling. Similar waivers were granted to installations in hot climates where air conditioning was considered a necessity, and more amenities and larger rooms were incorporated in buildings designed to house elite or specially trained units, such as SAC bomber crews who were afforded slightly more space and privacy than other enlisted personnel. Due to the common factors impacting design and construction of all Department of Defense unaccompanied personnel housing, much data related to Congressional actions is referenced to the earlier UPH study conducted for Army installations (Kuranda et. al.:2003).

The types of unaccompanied personnel housing currently managed by the USAF are identified in the 2005 USAF real property inventory and listed in Table 1. The 2005 USAF real property inventory identifies not only the types, but also the quantities, of UPH located at each USAF installation. Fourteen installations have more than 30 such facilities. Table 2 depicts the quantity and construction date ranges of the most prevalent types of unaccompanied personnel housing at each of the installations. The data suggest that the majority of extant USAF UPH from the Cold War era are barracks and officer’s quarters constructed during the 1950s and 1960s.

Kirtland Air Force Base is a representative example of an installation and reflects the trends in ammunition storage and unaccompanied personnel housing exhibited during the Cold War. Site development took place during World War II with the initial construction of the base for use by the U.S. Army Air Forces. The Air Force took control of the base in 1947 and it continued in active use throughout the Cold War. Although not a part of Kirtland when constructed, the Manzano Base is now under control of the Air Force and was one of the first bases constructed as a national storage site for nuclear weapons, and possesses a variety of buildings associated with the storage, assembly, and maintenance of nuclear weapons.

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Unaccompanied personnel housing on the base includes standard masonry dormitories, and several of the dormitories exhibit design features comparable to those constructed by the Army.

Table 1 Current types of USAF unaccompanied personnel housing

Category Code	Description
Enlisted Personnel	
721312	Dormitory, Airman, Permanent Party/PCS-Student
721313	Technical Training Student Housing
721314	Dormitory, Unaccompanied NCO
721315	Transient, Dormitory, Visiting Airman Quarters
721311	Recruits Dormitory
Mess Facilities	
721215	Dining Hall in Airman Dormitory
722345	Fast Food Service
722351	Airman Dining Hall, Detached
722356	Dining Hall, Officer, Detached
UPH Support Buildings	
723155	Dayroom, Lounge
723242	Garage, Automobile
750663	Privately Owned Vehicle Washrack
Dining Support Facilities	
723385	Kitchen, Central Preparation
723388	Flight Kitchen
Latrine/Shower Facility	
714124	Attendants Sanitary Facilities
723392	Sanitary Latrine
Officers	
724415	Officer’s Quarters
724433	Cadet Quarters
724417	Visiting Officer’s Quarters
Emergency UPH	
725513	Civilian Camp
725517	Troop Camp

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Table 2 USAF installations with more than 30 buildings for unaccompanied personnel housing as of 2005

Installation	Quantity of Facilities	Most Prevalent Types and Construction Date Ranges of Facilities
Little Rock AFB, Arkansas	46	13 enlisted and training dormitories built between 1955 and 1956; 18 troop camp facilities built in 1984 & 1985
Edwards AFB, California	54	12 enlisted dormitories and 32 officer's quarters built between 1952 and 1958
Travis AFB, California	32	16 enlisted dormitories built in 1954
Vandenberg AFB, California	37	15 officer's quarter built in 1965; 8 enlisted dormitories built in 1972
Eglin AFB, Florida (Includes three auxiliary fields)	51	11 enlisted dormitories built between 1954 and 1955
Tyndall AFB, Florida	31	7 enlisted dormitories built between 1976 and 1989
Andrews AFB, Maryland	35	4 enlisted dormitories built in 1959; 20 officer's quarters built in 1946
Alpena County Regional Airport, Michigan	38	31 troop camp facilities built in 1954
Minot AFB, North Dakota	32	13 enlisted dormitories built between 1957 and 1966
Tonopah Auxiliary Airfield Annex, Nevada	80	30 enlisted dormitories built in 1982
Lackland AFB and Training Annex, Texas	58	10 enlisted and training dormitories built between 1951 and 1955
Laughlin AFB, Texas	46	30 officer's quarters built between 1959 and 1969
Sheppard AFB, Texas	30	12 training dormitories built between 1968 and 1987
Volk Field, Wisconsin	34	31 troop camp facilities built in 1956

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2.0 OBJECTIVES AND METHODOLOGY

2.1 Objectives

Kirtland Air Force Base was constructed during World War II and continues in use as an active military installation. The installation currently contains 169 buildings for the storage of ammunition, and 22 buildings classified as unaccompanied personnel housing. All the aforementioned buildings were constructed during the Cold War; however, this list is not comprehensive as it only lists buildings currently used for storage or housing. Several buildings currently have different uses, and are not enumerated in the current inventory. The purpose of this project was to document representative examples of ammunition storage facilities and unaccompanied personnel housing at Kirtland Air Force Base including new designs created during the Cold War, buildings associated with the base's Cold War mission as a National Stockpile Site for nuclear weapons, and to examine changes to buildings made during the Cold War.

2.2 Methods

This illustrated study is the result of an integrated program of archival research, site investigation, data analysis, and report preparation undertaken in 2008. The results of the study are presented in the following technical report.

A variety of sources were consulted during the preparation of this report. Previous studies reviewed included *Army Ammunition and Explosives Storage in the United States: 1775-1945* and *Historic Context for the World War II Ordnance Department's Government-Owned Contractor-Operated (GOCO) Industrial Facilities, 1939-1945* (Murphey et al. 2000; Kane 1995). These two reports provided general background information on the history of ammunition production and storage facilities of the World War II era. A third study, *Unaccompanied Personnel Housing (UPH) During the Cold War (1946-1989)* details the evolution of Army UPH, and provides general information on government policies and Army practices that influenced Air Force construction (Kuranda et. al. 2003). Two studies provided general background on the Cold War-era missions, and the development of nuclear weapons: *A Systemic Study of Air Combat Command Cold War Material Culture. Volume 1: Historic Context and Methodology for Assessment* and *Early DoD-Sited Nuclear Warhead Infrastructure* (Air Combat Command 1995; Bilderback and Binder 1999). Previous cultural resource surveys and base histories were provided by the installation Cultural Resource Manager: *A History of Kirtland Air Force Base, 1928-1982; Historic Building Inventory and Evaluation: 377th Air Base Wing; National Register*

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of Historic Places Historic Context and Evaluation for Kirtland Air Force Base, Albuquerque, New Mexico; and, *National Register of Historic Places Historic Contact and Evaluation of Manzano Base, Kirtland Air Force Base, New Mexico* (Alberts and Putnam 1982; 377th Air Base Wing 1999; Van Citters and Bisson 2003; Van Citters and Butcher 2003). These documents provided background history of Kirtland Air Force Base and detailed many of the installation's missions.

Primary source materials were located at National Archives and Records Administration, College Park, Maryland, and in the archives of Kirtland Air Force Base, Albuquerque, New Mexico. The Kirtland Air Force Base Cultural Resources Manager (CRM) facilitated the site survey and resource photography and provided access to real property records, drawings, historic documents, and historic photographs.

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3.0 DEVELOPMENT OF KIRTLAND AIR FORCE BASE

3.1 World War II

Development of the current site of Kirtland Air Force Base began in 1939, when the United States Army leased 2,000 acres near the Albuquerque Municipal Airport from the City of Albuquerque. Construction of the base began in 1941, and the site was designated the Albuquerque Army Air Base. Initially, the base was planned to accommodate 225 officers and 1,970 enlisted personnel, which formed the 19th Bombardment Group. A spur of the Santa Fe Railroad was extended into the interior of the base, and stretched three miles in length. Eventually approximately 110 buildings were constructed and the 5,000 foot runway, shared with the municipal airport, was extended to 10,000 feet (Alberts and Putnam 1982:27 and 30).

The large expanse of land and the favorable weather made the base's location valuable for training. During 1941 the base was used for several exercises by squadrons and the bombardier school, which had been relocated to the base from Louisiana. The following year, the base was renamed Kirtland Field in tribute to Colonel Roy C. Kirtland who was an early aviator for the Army. The primary function of the base continued to be training for the bombardier school throughout World War II; by 1945, 5,719 students had been trained at the base. The base was also home to an aviation mechanics school and a glider pilot school (Alberts and Putnam 1982:33, 36, 39).

During the spring of 1942, 1,100 acres of property located east of Kirtland Field were acquired by the military in order to create an additional training base for aviators, mechanics, and personnel required for aviation support. The area initially was named the Albuquerque Air Depot Training Station, but by the following year when trained air base groups departed the station to serve overseas, the training mission ended and the station became the Albuquerque Army Air Field. For nearly a year, the base served as the Army Air Forces Convalescent Center, taking care of injured pilots and crew members and providing recreational activities for the betterment of patients. By spring 1945, the base was designated an air field once again and began accepting aircraft returning from overseas (Alberts and Putnam 1982:41-43).

In July 1945, the Albuquerque Army Air Field was acquired from the Army air forces by the Manhattan Engineer District in order to provide a storage and assembly area near Kirtland for machinery associated with the development of atomic weapons. By the end of World War II, Kirtland Field had 402 buildings, many of which were constructed due to the growing amount of students; the population of the base was 2,500, including military personnel as well as civilians

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(Alberts and Putnam 1982:33, 36, 39). Kirtland Field contributed to the end of World War II in two ways: crews for the B-29, the plane that dropped both “Little Boy” and “Fat Man,” were trained at Kirtland; and the base runways and bomb loading facilities were used to aid in the creation of the atomic bomb, which took place at nearby Los Alamos. Once the war was over, however, the population of the base dwindled, and Kirtland was put on stand-by (Alberts and Putnam 1982:39).

3.2 The Cold War Era

In December 1946, Kirtland was reactivated and designated as a United States Army Air Force Air Materiel Command installation. The following year, the 1947 Department of Defense Reorganization Act created a separate Air Force branch of the military and Kirtland Field was renamed Kirtland Air Force Base (Alberts and Putnam 1982:69).

Also in 1946, the Atomic Energy Commission was created; it took over the operations of the Manhattan Engineer District at the Albuquerque Air Field. The air field was renamed Sandia Base, after a neighboring mountain. In 1947, Sandia Base was taken over by the Armed Forces Special Weapons Project (AFSWP). The goal of the AFSWP at Sandia was to teach personnel how to build nuclear bombs. The 2761st Engineer Battalion was organized at Kirtland during this time. A portion of the battalion was responsible for security at the base; another portion assisted with bomb assembly. In 1949, the Navy organized a Naval Air Detachment at Kirtland to establish a relationship and advance the Navy’s nuclear capacity (Alberts and Putnam 1982:49-54; Van Citters and Butcher 2003:16-17; Van Citters and Bisson 2003:18).

Sandia Base had grown to include 50,000 acres by 1948. In 1948, the “Z Division” of the Manhattan District was designated as the Sandia Laboratory at the airfield and was considered a branch of the Los Alamos Scientific Laboratory. The Sandia Laboratory was operated by the University of California. The laboratory was used to “manage the engineering design, production, assembly, and field-testing of the non-nuclear components associated with nuclear bombs” (Van Citters and Butcher 2003:15). The Manhattan District constructed “guard, storage, administrative, and laboratory facilities” for the base in a fenced off area that was considered classified (Alberts and Putnam 1982:49). The following year, operation of the laboratory was transferred from the University of California to the Western Electric Company. During the late 1940s through the early 1950s, Sandia Base primarily completed work related to atomic weapons; developments led the base to turn their efforts to thermonuclear weapons (Van Citters and Butcher 2003:17-18).

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During the late 1940s, the military decided that in order for America to maintain their presence as a force during the Cold War, they must establish a nuclear stockpile. The storage areas, designated as “Q area” storage sites, would be located at various locations around the country; the task of creating the areas was called Project Water Supply. The initial three locations included Site Able at Manzano Mountain east of Sandia Base and Kirtland, Site Baker in Texas, and Site Charley in Kentucky. The Albuquerque District of the United States Army Corps of Engineers was granted $10 million to create Site Able; the Army, under AFSWP, took over the site. Site Able was in operation by the spring of 1950. Buildings at the site were designed to avoid enemy attack and also to avoid any effects to surrounding communities; they were located within the mountain side and included storage as well as maintenance areas (Van Citters and Butcher 2003:21-23, 25-26).

The AFSWP was established at Kirtland in December 1949. The command was designated as the operator of Kirtland and was also responsible for Air Materiel Command functions. During this same time, the 4901st Special Weapons Wing; the 4925th Special Weapons Group; the 4905th Maintenance and Supply Group; and the 4910th Air Base Group were designated as part of the AFSWP at Kirtland. AFSWP’s goal was to test atomic, chemical, and biological weapons. Biological and chemical weapons research previously taking place at Wright Patterson Air Force Base in Dayton, Ohio was relocated to Kirtland (Alberts and Putnam 1982:69-73; Van Citter sand Bisson 2003:104).

In 1950, a seven year master plan for expansion at Kirtland began. The plan included increasing test facilities at the base as well as extending the primary runway to 13,373 feet. Also during the 1950s, new headquarters for AFSWP, new hangers and permanent administrative buildings were built. The work was not completed until 1960 (Alberts and Putnam 1982:69-73; Van Citters and Bisson 2003:114).

In 1952, Kirtland Air Force Base was designated as part of the Air Research and Development Command, with the primary mission of analyzing, creating, and testing weapons coupled with aircraft. Work was coordinated with Kirtland, the Atomic Energy Commission, Sandia Laboratory, and Los Alamos (Van Citters and Bisson 2003:113).

During the early part of the Cold War, the military attempted to create weaponry that weighed less and required less maintenance. As a result, Sandia Laboratory created the “wooden bomb,” a weapon that did not require constant maintenance. The “wooden bomb” could be placed in storage indefinitely with minimal maintenance; it then could be retrieved from storage and used immediately. The key element of the new weapon was the use of “zippers.” The components eliminated the step of disassembly and initiator exchange and allowed easy

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replacement of the neutron source. In addition, the "wooden bomb" was a "sealed pit" weapon that eliminated the need to store the fissile portion of the bomb separately from the remaining components of the weapon, saving storage space and time (Van Citters and Butcher 2003:19).

The sealed pit concept continued to be explored at Sandia Laboratory during the 1950s. The concept was unique because it allowed the creation of one warhead that could be used in a variety of systems, alleviating the need for additional assembly and personnel (Van Citters and Butcher 2003:19).

A wide variety of experimentation and tests related to nuclear weapons took place at Kirtland Air Force Base in the 1950s. Tests were related to the flash blindness caused by the explosion of a nuclear bomb, neutron and gamma radiation affects on ground or air plane support personnel, "shock and blast effects," and bomb delivery techniques. Research also led to the creation of the MB-1 Genie, which was a "nuclear-tipped air-to-air rocket" (Van Citters and Bisson 2003:115 - 116). A contract for the development of the rocket was given to Douglas Airplane Company in 1955 (Van Citters and Bisson 2003:116 – 117). During this same time, Sandia Laboratory was working on developments of two types of weapons, bombs and warheads.

In 1952, Site Able was transferred to the Air Force and was designated Manzano Base. The Korean War caused stockpile sites, including Manzano, to expand. The amount of atomic bombs numbered 13 in 1947 and 56 in 1948. By the middle of 1950, however, there were approximately 198 atomic weapons in stockpile sites and by 1952, there were 800. The number of nuclear weapons expanded as well, numbering two in 1945, 841 by 1952 and 5,543 by 1958. By the end of the 1950s, thirteen stockpile locations had been completed; six were considered national sites and the remaining seven were smaller and considered operational sites (Van Citters and Butcher 2003:2730-31).

Advancements during the early 1950s reduced the amount of maintenance required for weapons stored at Manzano. As a result, by the 1960s, underground or hillside maintenance areas at the base were used for testing and storage that was required by Sandia Laboratory (Van Citters and Butcher 2003:33). The laboratory underwent 22 bomb programs and warhead designs beginning in 1953 and ending in 1961 (Van Citters and Butcher 2003:33).

During the late 1950s, scientists at Kirtland began experimenting on ways to protect materials from the radiation effects that followed nuclear detonation. The simulations included testing for structure hardness, or the ability to withstand nuclear effects, and testing the effects of electromagnetic pulse (EMP). Another test used a shock tube to simulate the shock waves of a nuclear explosion. This testing device was moved to Kirtland from Indiana in the early 1960s. (Van Citters and Bisson 2003:129)

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In 1961, ASFWC organized a non-commissioned officer academy at Kirtland. Each year, seven six-week sessions were held to instruct officers in “oral and written communications, training, leadership, management and supervision, drill, ceremonies, discipline, military justice, world affairs, history, and USAF organizations” (Van Citters and Bisson 2003:148).

During the early 1960s through the 1980s, EMP testing grew tremendously at Kirtland. The base eventually had seven EMP facilities by the end of the Cold War: ALECS, 1967; ARES, 1970; VPD-I, 1971; ATHAMAS, 1974; HPD, 1974; VPD-II, 1976; and ATLAS/“The Trestle,” 1980 (Van Citters and Bisson 2003:152 – 156).

In 1963, an Air Force Weapons Laboratory was created at Kirtland. The goal of the laboratory was to “research nuclear weapons, nuclear power, nuclear effects, and the vulnerability of United States weapons systems to nuclear attack” (Van Citters and Bisson 2003:24). During the same year, the Limited Nuclear Test Ban Treaty was signed by the United States, Great Britain and the Soviet Union. As a result, activities at Kirtland decreased and the Air Force relinquished 1,242 acres of land to the city of Albuquerque. Kirtland entered into a lease with the city in order to continue using the runways and taxiways (Van Citters and Bisson 2003:24).

Sandia Base was chosen as the location for a Gas Dynamic Laser (GDL) in 1969. The device was a “high-energy laser” with a tube and nozzle. Atoms within the tube would be electrified and the resulting beam of light would exit the nozzle. The device was used to test the capabilities of lasers as an alternative to conventional weapons. The Army and the Navy also had GDLs for testing. The research facility was designated the Sandia Optical Range and it began operations in 1971. Eventually, by 1972, the GDL at Sandia was paired with a Field Test Telescope, allowing the laser to be aimed at a moving target. The following year, the combined devices were used to successfully hit an aerial target (Van Citters and Bisson 2003:162 – 164).

In 1971, Kirtland Air Force Base, Sandia Base, and Manzano Base were incorporated together to form the Kirtland Air Force Base. Sandia had 47,000 acres of land at the time, Manzano and Kirtland both had less than 3,000 acres. Several administrative and support buildings at the three sites were merged after the incorporation and weapons maintenance areas also were combined. Sandia Laboratory became a tenant of the base (Van Citters and Butcher 2003:35).

The Air Force Test and Evaluation Center was created at Kirtland in 1974. Their mission was to evaluate and test new planes and systems entering the Air Force. In 1977, Kirtland Air Force Base was designated as part of the Military Airlift Command (Van Citters and Butcher 2003:36; Van Citters and Bisson 2003:24).

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In 1980, the most impressive of EMP facilities was completed at Kirtland by the Air Force Space Technology Center. The creation of the “Trestle” was discussed for 11 years before it was actually constructed (See Plates 205 and 206). It is a 12 story structure constructed entirely of wood. The actual test stand measures 200 feet wide by 200 feet long and is 118 feet tall. The structure is the only one of its type that is capable of testing a B-52, C-5A, E-4B, B-1 and a variety of large planes. The simulator allows the aircraft to be tested in simulated flight with realistic scenarios. Construction on the facility began in 1976 and cost 58 million dollars (Van Citters and Bisson 2003:156 - 157, 182).

In 1979, Kirtland Air Force Base was New Mexico’s largest employer, with approximately 16,000 personnel working at the base. The base generated a large amount of money to boost the economy of Albuquerque, producing approximately 361 million dollars (Alberts and Putnam 1982:80). A more recent study, in 1997, indicated the base’s economic contribution to the city was approximately 1.6 billion (GlobalSecurity 2008:n.p.).

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4.0 AMMUNITION STORAGE FACILITIES AT KIRTLAND AIR FORCE BASE

4.1 Introduction

Kirtland had six distinct, weapons storage areas. The number of ordnance areas is a result of the arrangement of the base at the end of World War II. At the dawn of the Cold War, Kirtland was composed of three discrete entities with separate administrative and organizational structures: the Air Force base itself; Sandia Base, housing the laboratories and support buildings of Sandia Labs; and, Manzano Base, operated by the Atomic Energy Commission and Army Materiel Command as a National Stockpile Site for atomic, and later, thermonuclear weapons. Each of these entities constructed and maintained its own array of ammunition storage facilities. Immediately south of the main runway, two munitions storage areas were constructed between 1954 and 1960 containing 14 magazines for the storage of conventional munitions. To the south and east of these areas, the 26000 area contained the first 16 magazines constructed for storage of components for the first generation atomic weapons. Approximately two miles southeast of the 26000 area is a fourth munitions storage area. The 28000 area contains ten magazines; however, the 2005 Air Force Real Property Inventory notes only two constructed during the Cold War. Slightly over four miles southeast of the 28000 area is a fifth munitions storage area. Constructed during World War II, the magazines in the 29000 area were directly related to experimentation by the New Mexico Proving Ground and the development of the proximity fuze. Although the 2005 Air Force Real Property Inventory accredits a construction date of 1955, all other sources list the World War II-era for the completion of these earth-covered magazines. The largest concentration of ammunition storage facilities is located at the historic Manzano Base. This highly secured location was constructed during the early Cold War as a National Stockpile Site, and housed the magazines and shops for nuclear weapons; an area often referred to as a Q-Area (Weitze 1999:97).

4.2 Manzano Base

The main weapons storage area at Kirtland Air Force Base was one of thirteen installations constructed between 1946 and 1956 for the storage and maintenance of atomic weapons (see Table 3). Known as Able Base, the weapons storage area at Manzano was a separate and distinct command from Kirtland Air Force Base. Able Base was operated by the Air Materiel Command (AMC), and the nuclear components of the weapons were under the custody of the Atomic Energy Commission (AEC) and only released to the Air Force under strictly controlled protocols. In addition to AMC and AEC personnel, staff from Sandia National

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Laboratories (SNL) was on-site to perform the actual maintenance operations and to instruct Air Force personnel. Construction of Able Base began in 1948 and was partially operational in late 1949 with the first atomic weapons arriving in 1950. Manzano was originally an Army operated installation, but in February 1952, the Army and Air Force switched custody of Sites Able and Baker. Manzano remained under joint AMC/AEC control until 1962 when the Atomic Energy Commission surrendered its custodial role. The individual identities of Manzano Base and Sandia Base were lost in 1971 when both were merged with Kirtland Air Force Base. Manzano Base continued in use for the storage of nuclear weapons until 1992 when the Kirtland Underground Storage Complex became operational. Some of the facilities continue in use for various purposes (Bilderback and Binder 1999:39).

Table 3 Stockpile sites constructed for the storage of nuclear weapons (Bilderback and Binder 1999:36)

Base Name	Designation[1]	Location	Type	Service[2]
Manzano Base	Able	Kirtland AFB, NM	National Stockpile Site	Air Force
Kileen Base	Baker	Gray AFB (Ft Hood, TX)	National Stockpile Site	Army
Clarksville Base	Charlie	Campbell AFB (Ft. Campbell, KY/TN)	National Stockpile Site	Navy
Bossier Base	Dog	Barksdale AFB, LA	National Stockpile Site	Air Force
Caribou Air Force Station	Easy	Loring AFB, ME	Operational Storage Site	Air Force
Rushmore Air Force Station	Fox	Ellsworth AFB, SD	Operational Storage Site	Air Force
Deep Creek Air Force Station	George	Fairchild AFB, WA	Operational Storage Site	Air Force
Fairfield Air Force Station	How	Travis AFC, CA	Operational Storage Site	Air Force
Stony Brook Air Force Station	Item	Westover AB, MA	Operational Storage Site	Air Force
Skiffes Creek Annex	Jig	Yorktown Naval Weapons Station, VA	Operational Storage Site	Navy
Medina Base	King	Kelly/Lackland AFB, TX	National Stockpile Site	Air Force
Lake Mead Base	Love	Nellis AFB, NV	National Stockpile Site	Navy
North Depot Activity	Yoke	Seneca Army Depot, NY	Operational Storage Site	Army

[1] The gap in code names from Love to Yoke is probably due to the use of those names for overseas bases.
[2] Site Able was originally assigned to the Army, with Baker serving the Air Force. The service assignment of the two bases were switched due to the strong Army presence at Baker and the Air Force's at Able.

The original concept for the handling of atomic weapons was to construct and operate only the first three national stockpile sites. In the event of a full scale deployment of atomic weapons, aircraft at selected SAC bases were required to travel to a national stockpile site to receive weapons, then proceed to its target. The time required to accomplish this, led SAC to

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estimate that it could not penetrate Soviet radar with a mass strike force in less than 36 hours. The escalated Cold War tensions with Communist nations combined with the invasion of South Korea by the Chinese-backed government to the north, made it clear that an alternative solution was needed. The operational storage sites, located within the United States and at bases hosted by European allies, reduced the time needed to get planes in the air to six hours; eventually, with the development of the ready-alert concept, that time would be reduced to 15 minutes (Weitze 1999:107-108). As the stockpile of atomic weapons grew, from 13 in 1947 to nearly 2,300 in 1955, additional storage space was created at the three original national storage sites, and the AEC constructed three additional national stockpile sites.

To understand fully the ammunition storage facilities, and the Cold War missions of Manzano Base, it is necessary to discuss the basics of nuclear weapons and the buildings and activities of an operational Q-Area. The earliest atomic weapons are considered fission bombs where a slightly sub-critical mass of radioactive material, primarily plutonium, becomes critical by imploding the material, creating an almost instantaneous chain reaction by bombarding the molecular nuclei with neutrons causing them to split releasing large amounts of energy; a process called fission (Plate 2).[1] The spherical mass of plutonium is also called the "capsule" or "pit." The implosion is created by detonating carefully formed "lenses" of explosive material that surrounds the spherical mass. To successfully initiate fission, the pit was not only compressed, but additional neutrons were introduced to start the reaction. This was accomplished by inserting an initiator into the center of the capsule. The pit was roughly the size of a grapefruit and weighed from 11 to 13 pounds.

Generally, the capsules were stored separately from the explosive component of the weapon, and were not inserted until the bomb was needed. While in storage, the capsules required regular maintenance. The spherical mass of plutonium would oxidize and required cleaning. Additionally, the early initiators used polonium and beryllium. The polonium isotope, Pu^{210}, had a half life of only 138 days and each capsule required a new initiator at that time. To accomplish this, each storage site required specialized buildings to store the capsules and perform necessary maintenance. At Manzano Base, an underground complex was excavated from the solid granite of the mountain (Plate 3). At the other two early national stockpile sites, the facilities were a combination of underground and aboveground buildings. Referred to as Plant 1, all facilities needed for maintenance of the weapons, inert storage, administrative areas, break and

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[1] The majority of weapons produced during the early Cold War were plutonium based, implosion-type weapons; however, some gun-type uranium capsules were in the nuclear arsenal. This discussion will focus on the implosion-type bomb, but the storage and handling procedures were virtually identical.

change rooms, emergency generators, and support facilities were located deep within the mountain side. The work areas and interconnecting tunnels were of reinforced concrete with vertical side walls and arched roofs; very similar in appearance to an earth-covered igloo magazine (Plate 4). Storage of capsules took place in facilities referred to as “A Structures” (Plate 5). At Manzano Base, the A structures are an integral component of the underground complex that included all the facilities needed in the maintenance of nuclear weapons. Special security measures were incorporated into the construction of Plant 1 and the areas used for storage of capsules (Plate 6). These included heavy bank-type vault doors. Additional security for the nuclear material was provided by each door having two combination locks; no single person knew both combinations (Plate 7). This level of security was required to prevent tampering with the capsules, but also because it was reported that the manufacture of plutonium made up a significant part of the nation’s Gross National Product in the early 1950s (Lamb Associates 1996:2-5). Each cell measures approximately 10 feet wide, 13 feet long, and 9 feet high. The cells are fitted with steel shelves where the nuclear material was stored (Plate 8). The capsules were contained within steel cylinders supported by a steel framework referred to as a bird cage (Plate 9). The bird cages were specially designed to maintain a safe distance between each plutonium sphere; if the materials were placed too close together, they may approach a critical state. Each cell could hold about 30 capsules contained in individual bird cages.

Every 138 days, each capsule was removed from the A-Structure and taken to a maintenance facility called a “C-Structure.” Like the A Structures, the laboratories of the C Structures at Manzano are in two rooms of the underground complex. Each lab originally had wooden benches where the maintenance work was performed. Maintenance of the capsule included carefully removing it from its container, placing a Plexiglas glove-box over the capsule, and then unscrewing a plug of machined plutonium from the sphere. The initiator was then removed from the core of the capsule and a new one inserted. The plug was put back into place and the sphere cleaned of any oxidation. The initiators were manufactured at Sandia Labs in New Mexico, and the used items were packaged and returned to the lab for refurbishment (Lamb Associates 1996:2-7). To insure the viability of the nuclear core, it was necessary to periodically measure the intensity of the nuclear material with a radioactive source. Known as sources, these contained neutron-emitting radioactive materials, that when moved closer to the plutonium sphere, would excite the plutonium sphere; the activity could be monitored by a Geiger counter. While many C Structures contained floor safes to secure the sources, Plant 1 shows no indication of a source safe, and it is possible that moveable device was used. After maintenance, the capsule was placed back in its cylinder within the bird cage, the lid secured with a lead seal, and the

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container pressurized with inert gas. It was then transported back to the A-Structure. Sealed initiators, developed between 1954 and 1957, replaced the polonium-beryllium type and lessened maintenance on capsules to annual inspections. By 1962, capsules themselves were phased out of the nuclear stockpile, and C-Structures were no longer used. Q Areas also contained buildings for the maintenance of the non-nuclear components of the weapons. These were located in other rooms of Plant 1.

In addition to the assembly, maintenance, and support complex, 76 concrete-arched, magazines were completed in 1949 and 1950 for Manzano Base. These magazines were designed by the Kansas City engineering firm, Black & Veatch, which designed all of the Manzano facilities. Although the designs generally followed standard plans developed by the Army Corps of Engineers, and were constructed in great numbers during World War II and the Cold War, the Manzano magazines had major differences.

The design philosophy behind the earth-covered ammunition storage facilities constructed at Manzano showed the influence of the Lake Denmark disaster; in the event the contents exploded, the main force of the blast would be directed upward through the roof of the magazine. For this reason, the crown of the vault was constructed with reinforced-concrete only six-inches thick, and the side walls gradually thickened to one-and-one-half feet at the foundation. The floor of the magazine was six-inches thick. Only two feet of earth covered the crown of the vault and the earth covering sloped to grade with a drop of one inch for every inch-and-a-half. The rear wall was eight-inches thick. The heavier coating of earth along the sides and rear of the shell helped prevent the force of the explosion from extending laterally. Should an explosion occur, there was little doubt that the individual magazine would be completely destroyed, but by controlling the direction of the blast, it would not lead to a chain-reaction with the explosion of nearby magazines. The igloo magazine was designed to withstand the force of an explosion equivalent to 500,000 pounds of explosives in another magazine 185 feet away. The weakest point of the structure was the exposed front wall which was constructed to survive the same explosion at a distance of 360 feet. The front wall was the heaviest section of concrete in the magazine with a thickness of eighteen inches from the foundation to the top of the door, and twelve inches from the door to the top of the wall. If necessary, an earth and concrete barricade was constructed opposite the door for added protection. The earth covering helped prevent heavy pieces of reinforced concrete from an exploding magazine from penetrating the shell of another (National Archives and Records Administration [NARA] 1954:8-12).

The igloo magazine also incorporated protection from lightning, static discharge, and fire. The individual pieces of reinforcing bar used in the construction of the shell were welded to each

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other forming a "Faraday cage." If welding equipment or experienced personnel were not available, the reinforcing bars were tightly connected with wire at each juncture. The cage was then grounded or connected to an underground wire that encircled the magazine, also known as a "counterpoise." The entire assembly created a uniform field integral to the shell that efficiently grounded any electrical charge. Additional protection from either lightning or static electricity was provided by connecting the steel door frame to the counterpoise, and grounding the door to the frame with a flexible metal strap. Each magazine had square concrete extensions from the top of the arch that extended slightly above the earth covering. Each of these supported lightning rods that were connected to grounding system of the magazine.

The interior of the magazine was unfinished concrete. Shallow trenches paralleled the base of the longitudinal and front walls to collect any water infiltration or accumulated condensation (Plate 10). Circular openings in the head wall of the magazine allowed water to flow out of the building. Ventilation of the magazine was required to remove fumes and aid in keeping the magazine dry (Plate 11). The only acceptable method of ventilation was the natural flow of air through the interior spaces. Ventilation was provided in the front of the magazine with louvered openings sealed by an adjustable damper near the bottom of the door. Ventilation in the rear incorporated a vent in the roof of the magazine, constructed of cast concrete or terra cotta with a metal or ceramic hood. Fire was also a concern. The majority of the ammunition depots were located in rural areas, oftentimes heavily wooded or on open grassland. Wildfires were a constant threat. The threat of fire required special consideration in the design of magazine ventilation systems. If fire approached the magazine, fusible links holding open the front and rear dampers would melt and counterweights automatically closed the dampers and sealed the magazine (NARA 1954:10).

The magazines at Manzano reflect many of the standard design features of 25 by 80 foot magazines constructed for conventional ammunition: concrete construction; drains paralleling the longitudinal walls; natural air circulation through vents in the front and rear; and double-leaf steel doors, which the Army incorporated into its designs in the post World War II-era. One aspect of the magazines, however, was quite different than the Army's conventional designs. The magazines at Manzano were used to store casings, explosive components, and fully assembled weapons with the capsule in place. The outward appearance of the storage facility was similar to a conventional igloo with a concrete headwall and steel double leaf doors; however, the doors were slightly different to provide additional security. Although the front doors were secured with a heavy padlock, the threshold of the door opening contained a three-inch deep trough. The doors were constructed to move vertically along the hinge pin (Plate 12). When the magazine held

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nuclear materials, the bottom of the doors dropped into the trench; a large hook fastened to the top of one leaf of the door connected to a ring at the top of the door opening. To open the doors, it was necessary to transport a specially designed hydraulic jack to the magazine, and raise the door until it was clear to swing away from the trough and the ring (Plate 13). A reverse procedure closed and sealed the door. When the doors were open, steel plates covered the trough and allowed forklifts and other heavy equipment to enter the magazine (Plate 14).

Forty-one of the structures were unique to the three national stockpile sites. Known as "Type D" structures, the magazines are excavated into the mountain side, similar to Plant 1, and accessed through lengthy corridors (Plate 15). Corridors varied in length from slightly over 40 feet to more than 120 feet (Plate 16). Double leaf portal doors secured the magazine, and only the head wall and portal are visible from the outside (Plate 17). The front portion of the access tunnel was excavated to remove soil and loose rock, then backfilled (Plate 18). The remaining length of the tunnel and the storage area are under solid rock (Plate 19). At the end of the corridor, a second set of jack-type doors provided access to the storage area. The access tunnel was constructed with vertical sidewalls and an arched roof, while the 26 foot by 60 foot storage chamber was similar to the arched-roof igloo (Plate 20). Rear ventilators were also installed with the vent opening appearing on the mountainside well above the entry. Although the magazines were built in the granite mountainside, an extensive grounding system was still required for protection from lightning strikes, but also to safely ground static electricity (Plate 21). The reinforcing steel of the storage chamber was grounded to the surrounding rock with either steel rods drilled into the rock, a ribbon of grounding cable encircling the magazine, or through a series of steel plates. Eight-foot long steel rods were drilled into the rock above the magazines to safely disperse a ground strike of lightning. Charcoal and salt were used to insure an electrical connection between the grounding system and earth.

The remaining 35 new magazines were reinforced-concrete, arched-roof, earth-covered magazines referred to as Type B structures; these would later become known as "Super Igloos" (Plate 22 and 23). Completed in 1950, these were similar to conventional igloo magazines but are called super igloos due to their extended length (Plate 24). The super igloos incorporate a 20 foot long by 12 foot wide entry tunnel with an additional set of double-leaf steel doors separating the tunnel from the storage area (Plate 25). The tunnel has vertical concrete walls and a semi-circular roof. The narrower width of the tunnel resulted in a head wall with a narrower parapet than conventional magazines (Plate 26). The interior features are identical to the other magazines with an 81 foot length, jack-type doors, ventilators, and floor gutters (Plate 27). Each magazine

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enclosed 2,146 square feet. A series of lightning rods extend above the covering along the top of the arch (Plate 28).

As the stockpile of atomic weapons grew, an additional underground maintenance and inspection plant was constructed at Manzano on the opposite side of the mountain from Plant 1 (Plate 29). Plant 2 was virtually identical in layout and configuration as Plant 1, containing the A and C structures needed for maintenance of the capsules and all the necessary support facilities (Plates 30 through 32). The increase in the numbers of atomic weapons and the accelerated maintenance schedule, prompted the conversion of seven of the Type D magazines into A Structures (Plate 33). From plans drafted in 1951 by Black and Veatch, a dual combination vault door was installed in a newly constructed concrete jamb in front of the original jack-type door (Plates 34 and 35). A few feet from the vault door, a steel security gate provided space for an armed guard to further regulate access to the magazine when the doors were open (Plate 36). The interior of the storage space was modified by the installation of reinforced concrete walls that divided the space into four cells with a central corridor (Plate 37). The corridor measured approximately eight feet wide, and each cell was roughly 9 by 30 feet. A steel door with single combination lock accessed each of the cells (Plate 38). Steel shelves to hold the birdcages were installed along the walls (Plate 39).

Shortly after the modification to these magazines, a series of pillboxes were constructed near the entrances to the newly-created A structures (Plate 40). These small, reinforced concrete structures were constructed with gun ports on three sides and a sliding steel hatch to provide access for security forces (Plate 41). It was reported that these were only occupied regularly the first year, then only used under special circumstances (Plate 42) (Van Citters and Butcher 2003:31). It is also possible that these were only manned when the magazine was open for maintenance of surveillance duties. The three-tiered access system with locked portal door, dual combination vault door, and jack-type door made unauthorized access all but impossible. Additionally, all magazines were equipped with a security system that would trigger an alarm in the main security office should anyone attempt to enter. The installation of the pillboxes, and other security buildings at the entrances to the two subterranean plants, reflects a change in position regarding possible threats to the nuclear stockpile (Plate 43). Access to the weapons storage area at Manzano was tightly controlled. Four barbed-wire topped fences encircled the area, and at least one of the fences was electrified. Guards constantly patrolled the area. The possibility of unauthorized access was virtually non-existent. In addition to foreign attack, which was partially resolved by the method of construction used for the plants and magazines, the

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military must have perceived an internal threat of sabotage or espionage that required additional security measures when specific facilities were in use.

First generation atomic bombs worked on the fission principle and had yields measured in kilotons (thousands of tons). As early as 1951, American scientists began development of a new weapon that relied on fusion (Plate 44). The basic principle was the application of intense heat and pressure on two hydrogen nuclei to fuse into a single helium nucleus. This reaction released huge amounts of energy. Successful tests of fusion bombs on Eniwetok Atoll in 1952 showed that the newly developed weapon, or thermonuclear bombs yielded over ten million tons of TNT, or ten megatons (Bilderback and Binder 1999:9-10). Thermonuclear weapons relied on a low kiloton implosion-type bomb known as the primary. The intense heat and pressure supplied by that reaction initiated the second reaction in the fusion vessel, known as the secondary. Several different fusion fuels were available including liquefied deuterium, tritium, lithium deuteride, or liquid hydrogen. Thermonuclear bombs began entering the stockpile in 1954, and reduced the need for the complex underground maintenance centers.

One of the significant improvements in atomic weapons took place in 1951 at Los Alamos laboratory when scientists perfected a method of “boosting” the reaction in a fission bomb. Basically, boosting involves injecting tritium gas into the fission reaction which increases the yield of the bomb by enhancing the ability to exploit neutrons generated by the detonation. This increased yield was vital in the fusion reaction of thermonuclear weapons, but also allowed for smaller high-yield fission bombs.

The introduction of thermonuclear weapons prompted another round of construction at Manzano. The new bombs weighed as much as 44,000 pounds and required the construction of a third assembly and maintenance plant, Plant 3 (Plate 45). Completed in 1955, this building served the same purposes as Plants 1 and 2 for the disassembly and maintenance of newly stockpiled thermonuclear weapons. These reinforced concrete structures typically contained three bays, with two bays with large sliding doors; the other bay held offices and support areas (Plate 46). Unlike earlier plants where each facet of the maintenance work was carried out in separately reinforced areas, the maintenance bays of the newer plants are not divided and the building was flat-roofed with vertical side walls (Plates 47 and 48). The two maintenance bays each had a large overhead crane rated at ten tons; inadequate to hoist the entire weight of the early bombs (Plates 49 and 50). A small room adjacent to the central bay held vacuum equipment that connected to a tall stack on the exterior of the building (Plate 51). This was used for venting tritium gas from the primary booster if needed. The floors were typically finished with a spark-proof coating, and ground straps were located along the walls. These plants typically operated for

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a short time as thermonuclear weapons developed in the late 1950s required virtually no maintenance (Lamb Associates 1996:2-9).

Another building needed in maintaining thermonuclear weapons is an “S Structure” (Plate 52). Plant 4 at Manzano, completed in 1953 closely resembles S Structures at other installations that handled nuclear weapons. S-Structures were completed to provide Sandia Lab personnel locations for training and surveillance activities. This move coincides with the transfer of a large portion of the stockpile from the AEC to the military, and the assumption of assembly and maintenance duties by military personnel. These irregularly massed one-story, flat-roofed buildings used either a reinforced concrete skeleton for the primary structural system with concrete masonry unit curtain walls, or were built entirely of concrete masonry units or the primary structural system, but were. The interiors were divided into several work areas. One bay, accessed by an overhead door, was used for maintenance of the electrical system (Plate 53). These bays lacked overhead cranes, implying that the weapon was rolled into the bay on a cart, and then connected to testing equipment through a series of connectors suspended from the ceiling (Plate 54). The other bay of the building was used for maintenance of mechanical systems. A 10 ton overhead crane was usually located in the bay to facilitate the assembly and disassembly of weapons (Plates 55 and 56). Also located within the building was a darkroom, one storage and one supply room, a room for maintenance of barometers, an equipment room, and a calibration room.

With the development of the tritium booster, new buildings were required for the storage of the gas cylinder. Referred to as “Short A-Structures,” “Short igloos,” or “Type VI” magazines (Plate 57). They are referenced on drawings completed in 1963 at Manzano as “Type A” structures. Two of this magazine type were built at Manzano; one in 1953 and the second in 1954 (Plate 58). Measuring 12 by 24 feet, the Type VI magazine used vertical sidewalls and a semi-circular roof (Plate 59). A heavy steel door provides access to a second door, which leads to the first chamber of the magazine. The building is divided into two chambers; 12 by 12 foot and 10 by 12 foot. A second heavy steel door divides the two chambers. Tritium boosters were stored in the rear chamber, with maintenance operations taking place in the front chamber. Tritium, a radioactive hydrogen gas, decays rapidly leading to increased pressure. If the cylinders were not periodically vented, this increased pressure could lead to the cylinder rupturing (Bilderback and Binder 1999:89). A vacuum system in the front chamber exhausted the vented gas to the atmosphere, and a second system maintained a constant flow of fresh air to prevent concentrations of gas within the building. The two vertical stacks near the front of the magazine provide intake and exhaust mechanisms for the systems.

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Additional magazines were also constructed in 1953. These new magazines were built to the east of Plant 2 in two parallel rows. Forty-four magazines, designated “Type C,” were built (Plate 60). These magazines covered 2,432 square of feet of space and measured almost 83 feet in length and slightly over 29 feet in width. Construction techniques were similar to other earth-covered, arched-roof magazines with double-leaf, steel, jack-type doors; front and rear ventilators; lightning protection; and drainage system. Lacking the narrow tunnel entrance of the super igloos, the top of the parapet wall is wider on the “Type C” magazines (Plate 61).

4.3 Conventional Weapons Storage

Two of the conventional weapons storage areas at Kirtland Air Force Base were not accessible due to security restrictions. Area 26000 contained the first 16 magazines constructed for the storage of atomic weapons components in 1946. From available information, ten of these appear to be conventional earth-covered igloos similar to Type C magazines built at Manzano. The remaining six magazines appear to be much smaller, earth-covered magazines. These could be similar to those constructed in the 29000 area. The other inaccessible area contains buildings 750 through 755 (Plate 62). This area is rectangular in shape and contains four, 30-bay, multi-cube magazines and a rocket storage, checkout, and assembly building (Plates 63 and 64). The buildings in this area were all constructed in 1960.

Buildings 741 through 748 are located in a separate compound southwest of the other 700 series buildings (Plate 65). Both buildings 741 and 742 are rectangular, segregated magazines. Building 741, constructed in 1957, contains six bays secured by steel doors; each door has a screen covered ventilator in the lower portion (Plate 66). The building is set on a poured concrete foundation and built of concrete masonry units (Plate 67). The shallow-pitched shed roof is covered with a built-up roof system, and the eaves are trimmed with sheet metal (Plate 68). The roof is lined with five, cylindrical ventilators topped by conical rain caps, and one ventilator with a cylindrical cap. An extensive lightning protection system encircles the roof of the building. Building 742 was completed in 1954 (Plate 69). This magazine is also six bays, constructed of concrete masonry units, and supported by a concrete foundation (Plate 70). The six steel doors do not contain ventilators. The front wall of the building is taller than on building 741, and screen covered vents are located in above each door; similar vents are on the rear door and the building lacks the rooftop ventilators. The building ends in a steeply-pitched shed roof with shingle roof covering, metal trimmed eaves, and lightning rods (Plates 71 and 72).

The remaining buildings are all earth-covered magazines. Buildings 744 through 748 are identical arched-roof, earth-covered magazines (Plate 73). The buildings were constructed in

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1954 and 1955, and closely follow Definitive Design AD 33-15-11 issued in 1952 and reissued in 1961 as Def. 33-15-11 R2 (Plate 74). The double-leaf steel doors are contained within a projecting jamb, and flanked by ventilators (Plate 75). The ventilators have fusible links and counterweights to close the openings in the event of fire (Plates 76 and 77). Each magazine has a rear vent and a series of lightning rods above the earth covering. All five magazines are 40 feet long and 26 feet wide, and the plans indicate that a mono-rail for handling heavy weapons was an installation option.

The final magazine in this area is Building 743 (Plate 78). This earth-covered magazine is also 40 feet in length, and was completed in 1954. The front wall is composed of a steel central section and concrete wing extensions (Plate 79). Double-leaf steel doors provide access to the interior; there are no vents in the front wall. The arch of magazine is composed of corrugated steel sections, overlapped and sealed with a waterproof membrane, then bolted together. Two small vents topped with lightning rods penetrate the earth covering, and the magazine lacks the large rear ventilator (Plate 80). Unlike the other magazines at Kirtland, Building 743 has a concrete faced barricade opposite the front wall. Located about 15 feet from the doors, the concrete headwall of the barricade is slightly taller than the magazine and tapers back from the base to the top (Plate 81). Earth fill was placed behind the concrete wall. Barricades were frequently used to lessen the distance between magazines, or to offer additional protection when the front wall was not constructed of concrete.

The 28000 Area contains three types of magazines: standard, 40 foot long, concrete, earth-covered magazines; 40 foot long, steel arch magazines; and much smaller earth-covered concrete magazines approximately 12 feet deep (Plate 82). The Air Force Real Property Inventory lists two magazines dating from the Cold War era; however, this area was not developed until after World War II and it is possible that this information was not captured due to the current use not reflecting ammunition storage. Additionally, Building 28051 was not located during the field survey. The identified magazine noted on the inventory is Building 28010. This structure is one of the small concrete, earth-covered magazines. This building is entered through a double-leaf steel door and contains a single vent in the center of the earth covering. Other property types in the 28000 area include Building 28004, an example of a 40 foot long concrete magazine (Plate 83). Access is provided by a single-leaf steel door contained within a projecting jamb. The door contains a single ventilator and a second vent is located at the rear of the magazine. The third type of magazine in this area is a steel arch type similar to Building 743, Building 28003 (Plate 84). The examples in the 28000 area differed slightly in that the concrete

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wing wall extensions and opposing barricade were not constructed on these buildings. In all other aspects, including the two ventilators, the buildings are identical (Plates 85 through 87).

The final storage area is the 29000 group of magazines. Although these were constructed during World War II to support research and testing of the proximity fuze, a brief discussion of the types of magazines is helpful. The 29000 area also contains three different magazine types. These include paired, steel arch magazines with a steel headwall, and a single vent for each magazine (Plate 88); steel arch magazines with a steel door frame holding double leaf doors, and a concrete wing wall; and, concrete box magazines with a rooftop vent and wood framed lower wall openings, and either flaring wing walls or no walls at all (Plates 89 through 91). All the magazines have an earth covering.

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5.0 UNACCOMPANIED PERSONNEL HOUSING AT KIRTLAND AIR FORCE BASE

5.1 Introduction

Kirtland Air Force Base currently has 21 buildings classified as unaccompanied personnel housing; however, this number does not include those buildings constructed as housing, but now having a different use. Among those buildings not captured in the current inventory are Building 30143, a three story barracks constructed for Manzano personnel, numerous dormitories constructed to support Sandia Base, and several converted buildings initially constructed for Kirtland Air Force Base. Kirtland Air Force Base experienced tremendous growth in the early 1950s, replacing many of the temporary World War II-era buildings, and constructed numerous enlisted dormitories and officers' quarters. As the base grew, World War II buildings were rehabilitated for continued use for both enlisted personnel and officers, but were eventually demolished. No new dormitories were constructed in the later Cold War era with most activity centered on remodeling and upgrades to existing buildings.

5.2 Construction During the 1950s

As with the ammunition storage facilities, unaccompanied personnel housing was constructed for each of three entities that now comprise Kirtland Air Force Base: the air base itself, Sandia Base, and Manzano Base. Two known unaccompanied personnel housing facilities were constructed to support Manzano Base. Building 30143 is a three story, reinforced concrete dormitory in the base's administrative and support area (Plate 92). The building is oriented to the west. This large dormitory is 300 feet long with the main entry centrally located in the building. Additional entrances are located at each end of the building. The main entrance is slightly recessed from the main plane of the façade, and contains a double-leaf, half-light door sheltered by a projecting concrete canopy (Plate 93). The field above the door originally featured a multi-light glazed area to illuminate the stair hall. The opening was framed by two bezels cast into the concrete, which extended downward to frame the doorway. The top of the entry tower extended slightly above the roof of the building. Additional staircases were located at each end of the building and also featured vertical bands of glazing for light. The residential portions of the building were pierced by nearly continuous ribbons of windows, broken only by the concrete columns of the buildings structural skeleton (Plate 94). The building's roof supported several cooling units and was encircled by a slight parapet wall. The building also had a full basement, possibly containing storage spaces, laundry, and mechanical equipment. A large stack rises at the

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rear of the building. Attached to the north end of the building is a two story section that likely held the dining hall for the building (Plate 95). It is set perpendicular to the main block of the building in a configuration, referred to in the Army unaccompanied personnel housing report as a hammerhead.

A second dormitory building at Manzano is Building 30132 (Plate 96). This building is considerably smaller than the main dormitory and likely served as officers' quarters. The two story building had a projection in the center that held the main entry and what appear to be lounges on both the first and second floors. Additional entries were at each end of the building. Windows were one-over-one double-hung sash with concrete sills and lintels. The main building material was concrete masonry units. Windows were arranged in pairs for the sleeping rooms, and single windows in each section of the building served bathrooms. The building had a flat roof that supported large cooling units. The building was heavily modified in the post Cold War era with a conversion to office and classroom space, and a complete reconstruction of the elevations (Plate 97).

Numerous dormitories and support buildings were constructed for Sandia Base. The first new dormitories constructed at Sandia Base were completed in 1950 (Plate 98). The construction effort included six new dormitories and two dining halls. All six of the residential buildings—numbers 20202, 20203, 20221, 20222, 20351, and 20352—were built to similar plans. The dormitories are irregularly massed, and basically composed of three rectangular sections. The buildings were constructed in pairs with the façade facing away from a central parking and courtyard area (Plate 99). Vehicle "tunnels" were constructed in the first floor of each building to provide access to the parking area (Plate 100). The central section of the buildings was three stories in height with the flanking wings only two stories tall (Plates 101 and 102). The buildings were constructed of concrete masonry units with a flat roof covered by a built-up roof surface. The exterior of the buildings were finished with a stucco coating. Two lounges and libraries were located on the first floor of each building (Plates 103 and 104). When constructed, the buildings had an interior corridor and contained one-, two-, and eight-man rooms (Plate 105). Some of the rooms were designated for non-commissioned officers (Plate 106). Large communal toilets were located in each section of the building (Plate 107). Light and ventilation were provided in each room through large multi-pane windows (Plates 108-111). The basement of the central section held laundry facilities and individual lockers for storage of personal items (Plates 112 and 113).

All the dormitories were heavily modified during the Cold War era. Buildings 20202 and 20203 retained the interior corridor, but were altered with new windows and exterior finishes, and the interior was reconfigured into offices and other administrative areas (Plate 114). The

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remaining four dormitories were the most extensively modified. The interior corridor was removed and a new balcony was constructed to provide access to the rooms (Plates 115 through 118). New bathrooms were placed in the location of the old corridor, and the rooms were reconfigured so that one room on each side of the building shared a bath (Plate 119). Each room had its own sink, dressing area, and closet. The rooms were either a 1+1 or 2+2 configuration (Plate 120). As part of the balcony installation, Buildings 20222, 20351, and 20352 had stepped columns installed to support the balcony roof, and Building 20221 had paired, tapered columns for the same purpose (Plates 121 and 122). The flat roofs of the four dormitories were replaced with a shallow hip roof covered in prefabricated metal panels (Plate 123). The renovations also included new doors and windows, and an upgrade of the first floor lounges.

In addition to the dormitory buildings, two dining halls were also constructed in 1950, buildings 20350 and 20204. No information was located on building 20204, but the footprint is identical to 20350. Building 20350 was designed to serve 1,000 people (Plate 124). It was a one and two story building with the kitchen and dining hall on the lower level. The partial second story, which covered the dining area contained a small base exchange with display counters, wall racks, dressing rooms, an alteration room, and a small office (Plate 125). The rear section of the upper level was for storage of goods sold in the exchange. The walls of the buildings were pierced by large banks of awning windows (Plate 126). Building 20204 now houses various offices and administrative spaces. Building 20350, called the Thunderbird Inn, was extensively altered in the post Cold War era. Alterations included an extension to the rear of the building creating a partially enclosed courtyard area, a double flight exterior stair to the upper level, new doors and windows, and the installation of an exterior insulation and finish system (Plates 127 through 130).

Three officers' quarters were also constructed at Sandia Base in 1950. Buildings 22001, 22002, and 22003 were located in the extreme northeast corner of the base. The buildings were constructed in a "U" configuration. The buildings were configured with one person suites containing sleeping and sitting areas and a private bath (Plate 131).   The three-story buildings originally had groupings of windows for each suite; a triple set with a central fixed sash flanked by awning windows for the sitting room; a small, single awning sash for the bath; and, paired awning windows for the bedroom (Plate 132). The windows were capped with a projecting, concrete canopy. A projection on one end of the building held the double-leaf entry door with a fixed sidelite, and large windows on the upper levels to illuminate the stairwell. A vertical band of awning windows in the sidewall of the projection provided additional light (Plate 133). A similar projection on the opposite end held a partially enclosed fire escape with a similar vertical

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band of windows. The buildings were topped with a shallow-pitched gable roof covered with a built-up roofing system. The concrete masonry unit walls were stuccoed.

In the post Cold War era, all three buildings were significantly modified (Plate 134). The groupings of windows were removed and replaced by casements (Plate 135). Typically, the sitting rooms had two windows and the bedrooms one (Plate 136). The bathroom windows were also replaced with a single, small casement. The bedroom windows were contained in artificial bump-outs. The area below the bedroom windows was recessed and four horizontal bars detailed the recess; the effect was that of a small balcony (Plate 137). The buildings were covered by a hip roof sheathed with prefabricated metal panels (Plate 138). An exterior insulation and finishing system was installed over the concrete block, and one story breezeways were constructed to connect the buildings at the interior corners (Plate 139).

Immediately east of the three officers' quarters, an officers' club and mess were also completed in 1950 (Plate 140). Plans for the club were prepared by the Austin, Texas firm of C.H. Page and Son, Architects-Engineers (Plate 141). The irregularly massed building was one story in height and constructed of concrete masonry units covered with a stucco finish. The main entrance was on the north side and accessed an entry vestibule that led to a large lobby. The building had a main lounge almost 100 feet long and a dining room that angled out from the lounge. A private dining room could be created at the end of the dining room by dividing the space with an accordion-type folding door. Both the dining room and lounge had a series of French doors that led to a terrace on the north. On one portion of the south side of the lounge was a logia, that also had French doors leading to an additional terrace. The remaining portion of the south lounge area led to a bar with elliptical tap area. The southwestern wing of the building housed the kitchen, while the southeastern wing had a ladies lounge, nursery, office, and a small apartment for the resident manager. Alternate plans called for an extension off the nursery for a library, and the enlargement of the wing to accommodate four guest rooms (Plate 142). It is unclear if these alternates were used during the initial construction, but plans dating from 1953 show both the library and eight guest rooms. The guest rooms are presumed to be of the 1+1 configuration.

Building 22000 underwent frequent periods of modification. By 1958, the lounge area was reconfigured, the ladies lounge reduced in size, the nursery eliminated, the library converted to a recreation room, and the manager's apartment converted into offices. Also by 1958, the basement had been converted into men's and women's dressing rooms with showers, a barbershop, a small lounge, and a space referred to as a "drum room" (Plate 143). Additional alterations took place after 1970 when the main dining room was nearly doubled in size. The

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large central lounge was also partitioned into a lounge area, and the old lounge converted into a meeting room (Plate 144). The guest rooms were also reconfigured into VIP suites (Plate 145). The exterior of the building originally had groupings of metal-framed awning windows, but these have been replaced with energy efficient units with two fixed sash windows over small awning sashes (Plate 146). The concrete block walls were also covered with an exterior insulation and finish system (Plates 147 and 148).

Several additional dormitories were completed ca. 1952. Building 20361 was one of a group of five hammerhead barracks in the southwestern portion of the installation.[2] These buildings were similar in design and layout to the large dormitory at Manzano, but slightly smaller at only 200 feet in length (Plate 149). The actual date of construction is unknown, but additional dormitories north of these, and a nearby dining hall, were completed in 1950 (Plate 150). The earliest available drawings are dated 1951 and were for building 20364 (Plate 151). The plans were prepared by Ferguson, Stevens & Associates, Architects and Engineers of Albuquerque. This building was a modified hammerhead with a mess hall at one end, the barracks area in the center, and an administration building on the other end (Plate 152). The building was the same overall length as the others, and housed fewer men. The drawings are labeled “Sandia Base – New Mexico, Troop Housing and Auxiliary Facilities, Barracks, 105 E.M. & Battalion Headquarters.” It is likely, that the other buildings of this group were constructed approximately the same time to similar plans, yet held slightly more personnel. The basic plan called for open squad rooms at each end of the building with mechanical spaces and restrooms near the center of the building (Plate 153). A large day room occupied the first floor near the buildings center, and a partial basement provided storage for the company housed in the building. The buildings were constructed with a concrete skeleton with a concrete masonry unit curtain wall (Plate 154). Expansive ribbons of steel-framed awning windows opened each of the three stories of the building (Plate 155). The buildings had flat roofs with a built-up roof coating. The buildings were continually modified throughout the Cold War (Plate 156). Drawings for other buildings of the group indicate that offices were later incorporated into the plans while retaining some squad rooms, and the mess halls were converted into other uses and contained what appear to be a training room, a darkroom, offices, and additional storage. Building 20361 is the only one to retain its original exterior appearance (Plate 157). The others have been modified with new windows and an exterior insulation and finish system.

Three additional officers’ quarters were constructed south of the officers’ mess in 1953 and 1954. Buildings 22010, 22011, and 22012 were identical buildings constructed from the

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[2] One of the buildings, 20360, was demolished at an unknown date.

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same plans (Plate 158). Each two-story building had 24, 1+1 rooms on each floor with one private room on the first floor, and three private rooms on the second level (Plate 159). The buildings originally had ribbons of windows on both floor with a central fixed sash flanked by awning units that provided light and ventilation to the rooms (Plate 160). The building was constructed with a concrete skeleton and concrete masonry unit curtain walls (Plate 161). The end walls and floor slabs extended beyond the curtain wall creating a shadowbox appearance (Plate 162). All the buildings were modified in the post Cold War-era. The interiors were converted into two room suites with separate sitting and sleep rooms and a private bath (Plate 163). Building 22010 retains its original appearance with projecting stair towers at either end, flat roof, and some of its original windows. Buildings 22011 and 22012 were extensively modified with replacement windows, artificial belt course below the windows, accentuated structural columns, covered entrances, metal cornice, and metal-clad hip roof (Plate 164). Both buildings were also covered with an exterior insulation and finish system (Plates 165 and 166).

The remaining unaccompanied personnel housing was constructed for Kirtland Air Force Base in the mid-1950s and 1958. The dormitories in the 900 area were completed between 1952 and 1955 in an area located just east of Parking Apron C (Plate 167). Plans for the buildings were developed in 1952 by the Detroit, Michigan firm of Harley, Ellington and Day, Inc., Architects-Engineers. These were standard plans developed for the Army Corps of Engineers, and closely followed what was referred to as an "I" dormitory. This building type was a two-story, rectangular, wooden building with a very shallow-pitched gable or flat roof. In some variants, two stair towers flanked the centrally-located first floor opening and projected slightly from the plane of the building. Other versions incorporated a single stair in the center of the building and exterior fire escapes on each end. A lounge area occupied the front portion of the center of the building on both levels, and laundry filled the rear of the center portion on the first floor. A second laundry was possible for the second level, but this space was often converted into two additional bedrooms housing three persons each. The dormitories at Kirtland contained 26 rooms, roughly 14 feet by 15 feet, on the second level and 24 rooms on the first level. The dormitories were constructed with an unusual configuration for the early 1950s; a 3+3 room arrangement for one block of buildings and more traditional three-man rooms with communal toilet for a second group (Plates 168 and 169). The central laundry on the first floor held washers, drying racks, a large sink, and places for ironing and folding clothes. Housing three persons in each room resulted in a per person ratio of 78 square feet each, well within the guidelines established by the Department of Defense.

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The two story, concrete masonry unit dormitories in the 900 area originally had large expanses of glass on each level. Paired, four light windows with awning sash provided light and ventilation for each room (Plate 170-Top). The bathrooms had single four light windows of a similar type. The lounges of the first and second floors had large blocks of windows with 16 lights and awning sash. The interior stair tower was also heavily glazed. The main entrance held full-light double-leaf doors sheltered by a concrete canopy. The flat roof was covered with a built-up roofing system. Although not detailed on the original drawings, a 1954 revision notes evaporative coolers installed on the roof.

Although the buildings retain their basic massing and scale, all four dormitories have undergone considerable modification (Plate 170-Bottom). All doors and windows were replaced, and the concrete block covered with an exterior insulation and finish system (Plates 171 through 174). The bathroom windows were also removed and replaced with mechanical ventilators. These dormitories were once part of a much larger housing area. Immediately east of the four dormitories was a complex of six additional two story I-Type dormitories (Plate 175). Also constructed of concrete masonry units, these buildings were constructed in 1952 with the two interior staircases housed in slight projections. Unlike the dormitories constructed in the middle part of the decade, these buildings had three-man rooms with communal baths. The original exterior appearance was likely similar to the other buildings with ribbon windows stucco covered concrete block walls (Plate 176). These were also modified during the later Cold War with new doors and windows and an exterior finish system. Only one of these buildings survive, Building 918. This single structure was heavily altered in the post Cold War era when the exterior corridor was removed and the building converted to a 2+2 configuration (Plate 177). The baths were installed in the corridor location. This renovation included an expansive exterior balcony system to provide access to the rooms, tapered balcony supports with decorative inset, metal railings, and the construction of a shallow-pitched hip roof (Plates 178 through 180).

When the airmen’s housing area was constructed in the early to mid 1950s, the complex included a two story squadron headquarters buildings and two dining halls. Building 923 is an example of one of the dining facilities. Plans for the dining hall were completed by William E. Burk, Jr., Architecture-Engineer, of Albuquerque in 1954 (Plate 181). These plans followed standard designs for Air Force dining halls with a reinforced concrete skeleton and concrete masonry unit curtain walls. Expansive areas of glazing provided natural light, and the inclusion of both hopper and awning sash would allow adequate ventilation (Plate 182). The kitchen area included a large clerestory with additional operable windows. The building was rectangular in footprint, and covered by a flat roof. The building remained largely unaltered until 1977 when air

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conditioning was added. This required the removal of some windows and the installation of both window and rooftop units. The first major renovation took place in 1992 when all windows were replaced, the clerestory enclosed, and an exterior finish system placed over the concrete block (Plates 183 and 184).

The final dormitory area was completed in 1958 in the 400 area, immediately west of the parking aprons. Development in this area included three, two story masonry dormitories and a dining hall (Plate 185). Plans developed in the early 1950s show three additional dormitories to the north of the dining hall, but the 1966 plat of the base does not indicate these buildings were ever constructed. Building 425 is the only building currently listed as unaccompanied personnel housing, but an adjacent building, Building 423, best reflects the original appearance of the three. Plans for the buildings were developed in 1957 by the Houston firm of Associated Architects. The first floor of each building had 21, three-man rooms while the second floor had 25 similarly configured rooms (Plate 186). The rooms measured 12½ feet by 18½ feet. Each floor had two communal toilets and a lounge; a laundry and mechanical room was located on the first level. The exterior of the buildings was stucco covered concrete masonry units (Plate 187). The structural concrete skeleton was not visible on the exterior (Plate 188). Banks of triple, four light windows with awning sash provided light and ventilation (Plate 189). The windows of the first floor were partially sheltered by a concrete canopy (Plate 190). The entry to the building opened into a grassy area in the interior of the three building cluster (Plate 191). A brick-faced projection held the double-leaf three-light doors, and the concrete canopy covering the first floor windows, was extended out to the shelter the opening (Plate 192). Open, steel fire escapes were located on both ends of the building (Plate 193). The original plans show only fan pads on the flat roof of the building; however, drawings developed in 1956 by W.C. Kruger & Associates of Santa Fe show the installation of large evaporative coolers on the roof, and the as-built drawings for this work were dated 1958. Two of the three dormitories were converted to administration buildings in 1965. The remaining dormitory was heavily modified with the addition of an exterior balcony, the conversion of the rooms to 2+2 configuration and the removal of the corridor, the installation of hip roof, and an exterior finish system was applied to the concrete block (Plates 194 through 197).

Harper & Kemp of Dallas designed the dining facility in 1956 (Plate 198). It was designed with 320 seats, and like many of the buildings, followed standard Air Force designs. Building 426 is largely intact and reflects the exterior design features of the building with large expanses of windows with awning sash, clerestory with windows, and projecting entry bay with twin staircases (Plates 199 through 203). The building was designed with evaporative cooling.

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The building served as a dining hall for less than a decade. Plans developed in 1966 called for the partitioning of the interior space into numerous offices and meeting rooms.

5.3 Construction During the Later Cold War

As with the dormitories and support buildings at both Sandia Base and Manzano Base, construction activity focused on renovation and rehabilitation rather than on new buildings. Only one small sanitary latrine associated with a recreational complex, Building 525 completed in 1963, is listed on the current Air Force inventory. This small, flat roofed building was constructed of concrete masonry units and had a redwood screen in front of the doors. The roof was covered with a built-up asphalt surface (Plate 204).

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6.0 SUMMARY

Kirtland Air Force Base contains numerous examples of ammunition storage facilities and unaccompanied personnel housing. As one of the first national stockpile sites for nuclear weapons, ammunition storage facilities at Kirtland represent a rare assemblage of facilities associated with the development of the country's nuclear arsenal during the 1950s and 1960s. The different types of buildings at Manzano Base also illustrate the rapid technological improvements in nuclear weapons through the initial facilities required for capsule maintenance evolving into the specialized facilities for tritium boosters, and those buildings needed for large, first generation thermonuclear bombs. Additionally, unaccompanied personnel housing at Kirtland illustrates the growth of AMC bases nationwide with extensive construction projects in the early to mid-1950s. Construction at Kirltand also reflects changing standards for more privacy and enhanced amenities in the later Cold War. The unusual 3+3 configuration of the dormitories in the 900 area imply that special considerations were made for aircrews associated with the critical mission of testing and/or transporting nuclear weapons to installations worldwide.

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Plate 1 Aerial view of Kirtland Air Force Base, 1980 (Courtesy Kirtland Air Force Base)

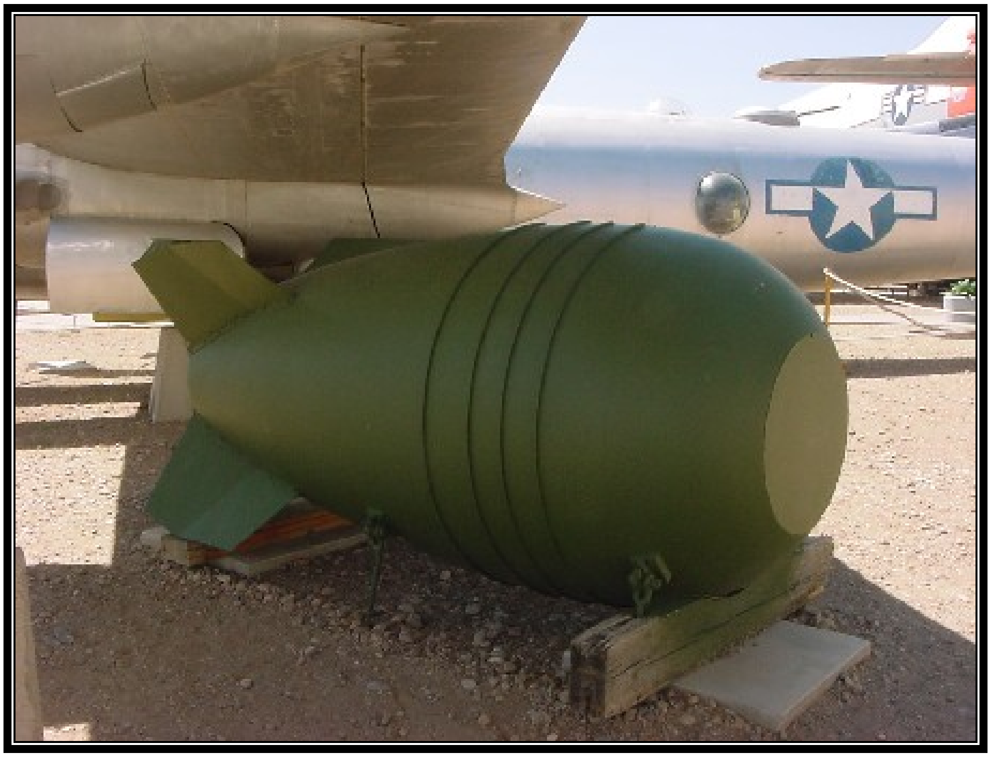

Plate 2 Early fission-type atomic weapon, the Mk-6 (Courtesy Ellsworth Air Force Base)

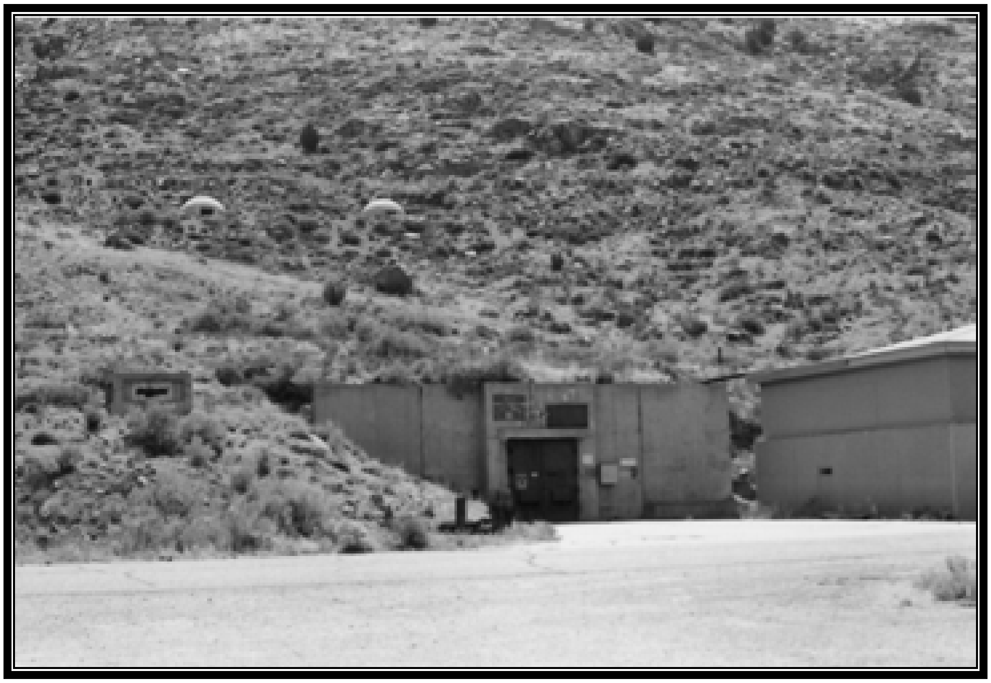

Plate 3 Entrance to Plant 1, ca. 1995 (Courtesy Kirtland Air Force Base)

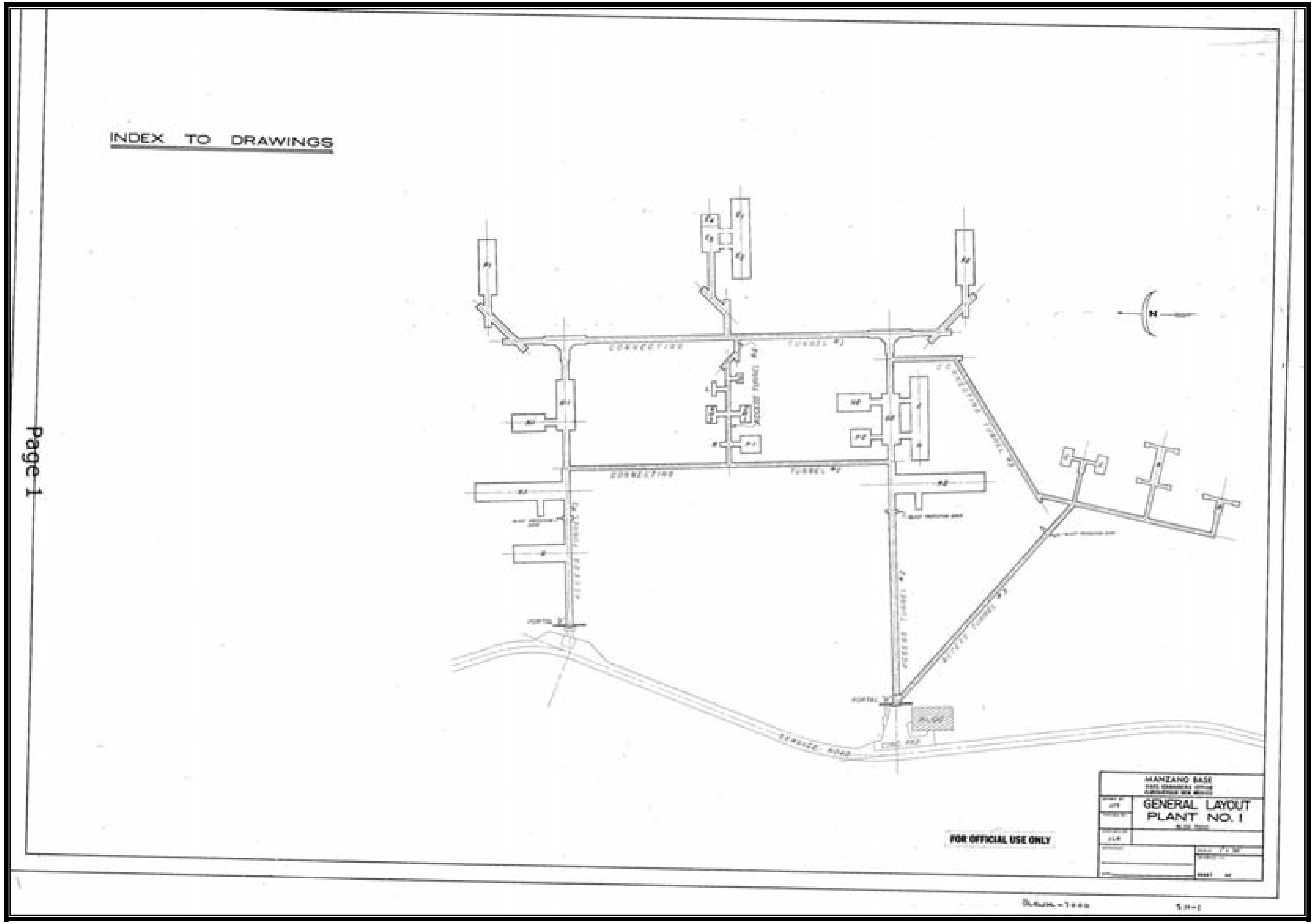

Plate 4 Schematic layout of Plant 1 (Courtesy Kirtland Air Force Base)

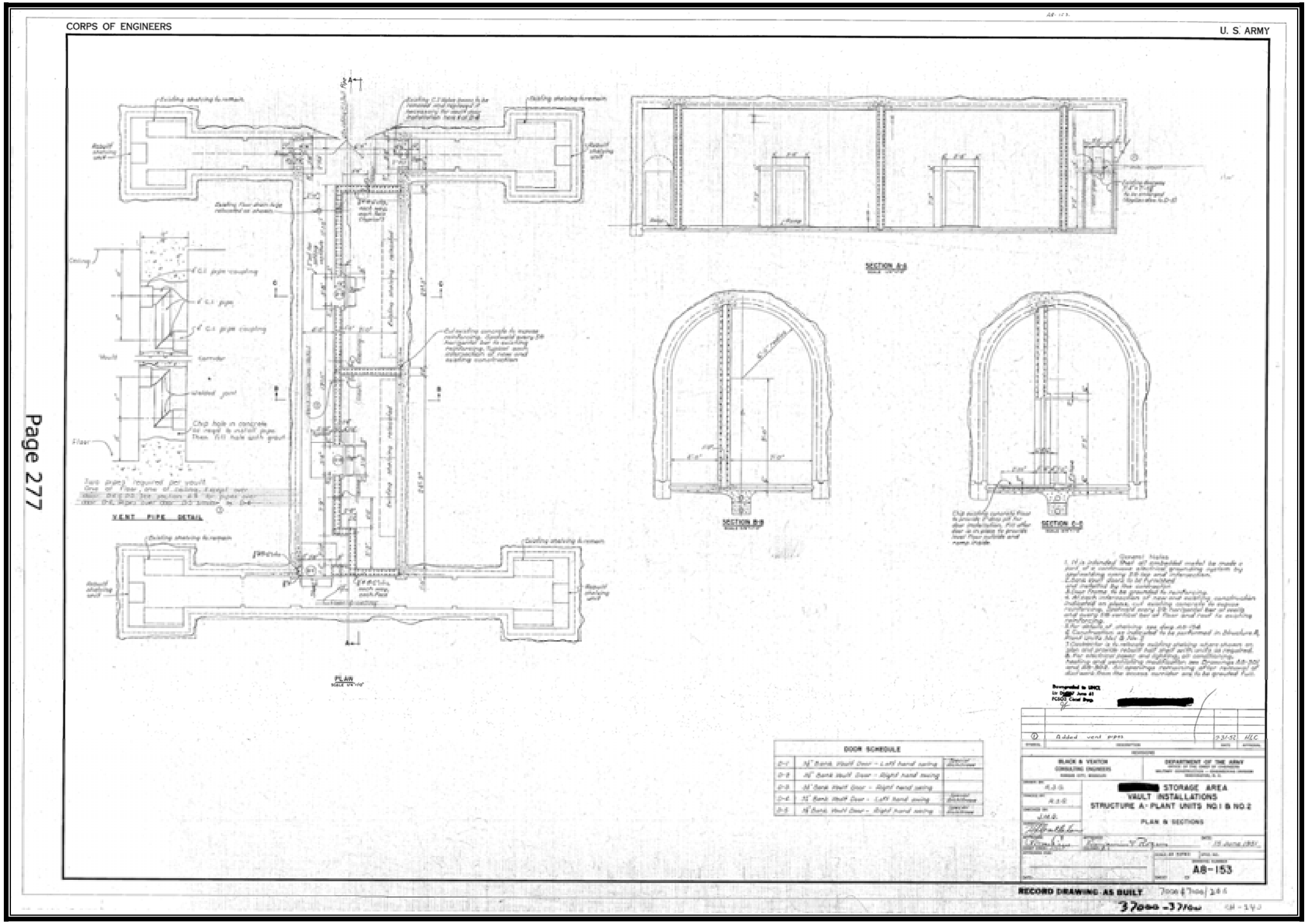

Plate 5 “A-Structure” of the Plant 1 underground complex (Courtesy Kirtland Air Force Base)

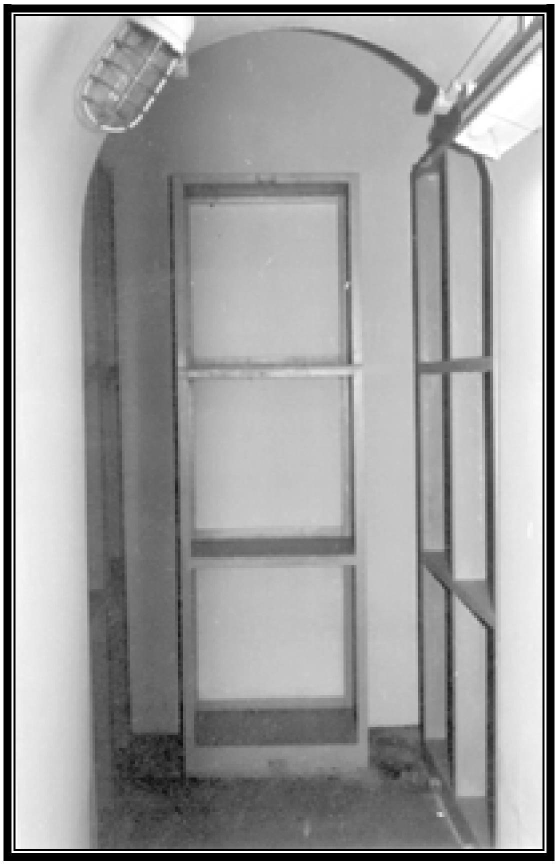

Plate 6 "A-Structure" within Plant 1, ca. 1995 (Courtesy Kirtland Air Force Base)

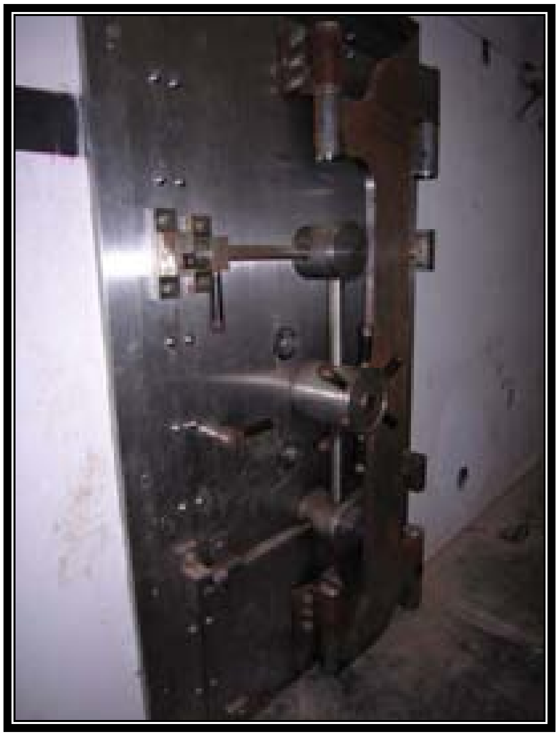

Plate 7 Typical dual combination lock on "A-Structure" door, Ellsworth Air Force Base (Photograph by RCG&A, 2008)

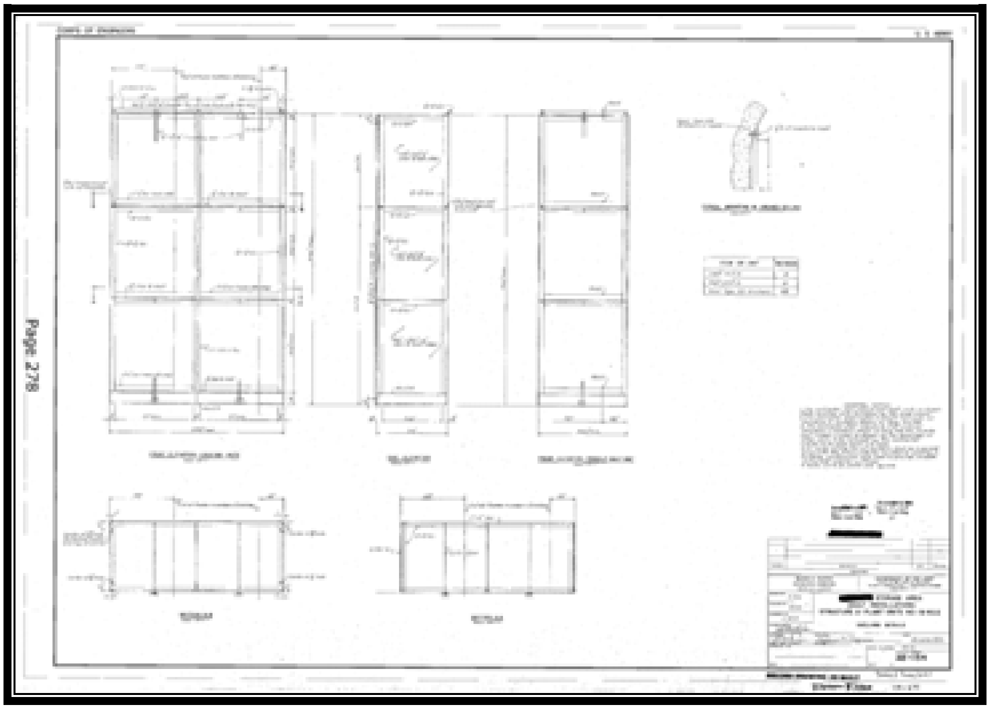

Plate 8 Design for metal shelving for “A-Structures” (Courtesy Kirtland Air Force Base)

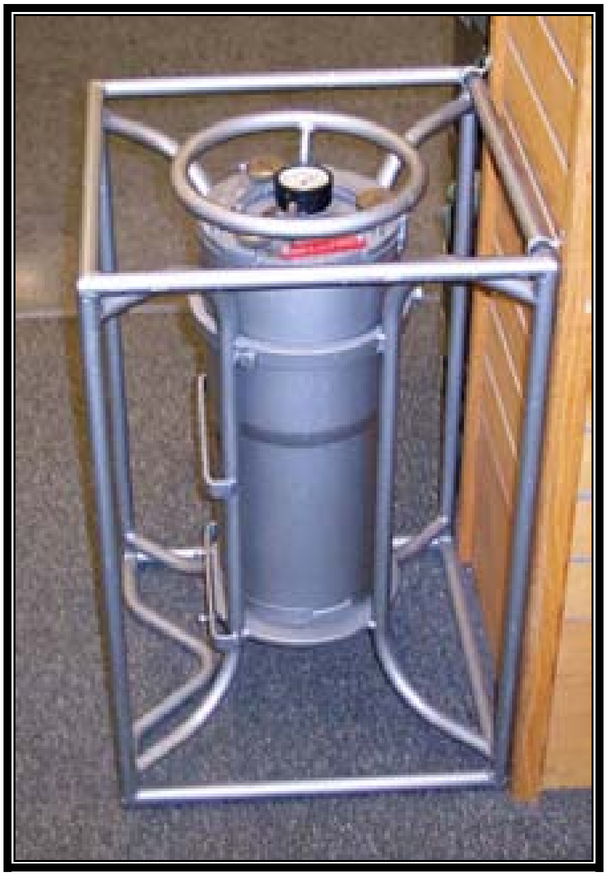

Plate 9 Typical birdcage for capsule storage (Courtesy Ellsworth Air Force Base)

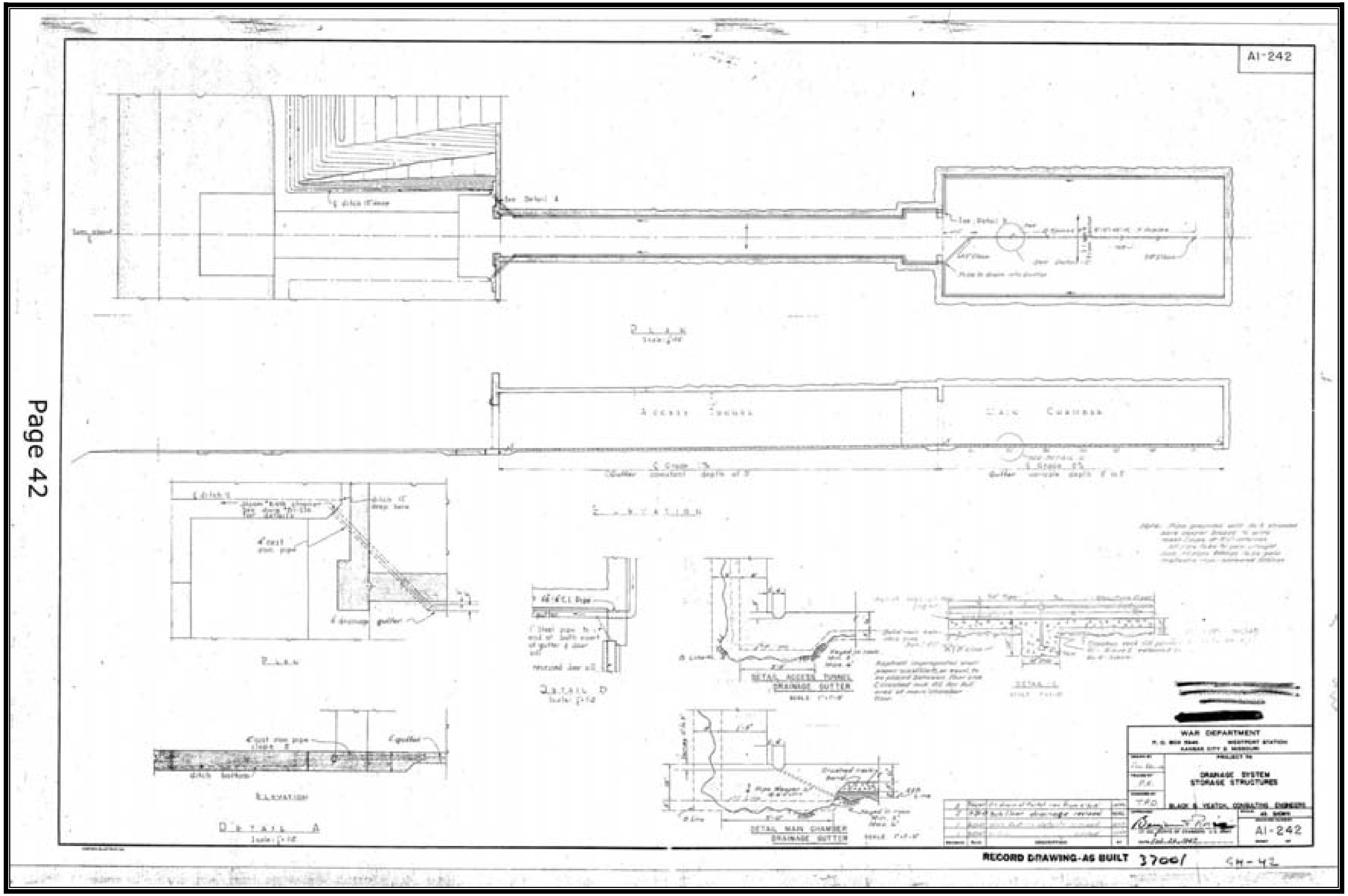

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Plate 10 Drainage plan for underground ammunition storage facilities (Courtesy Kirtland Air Force Base)

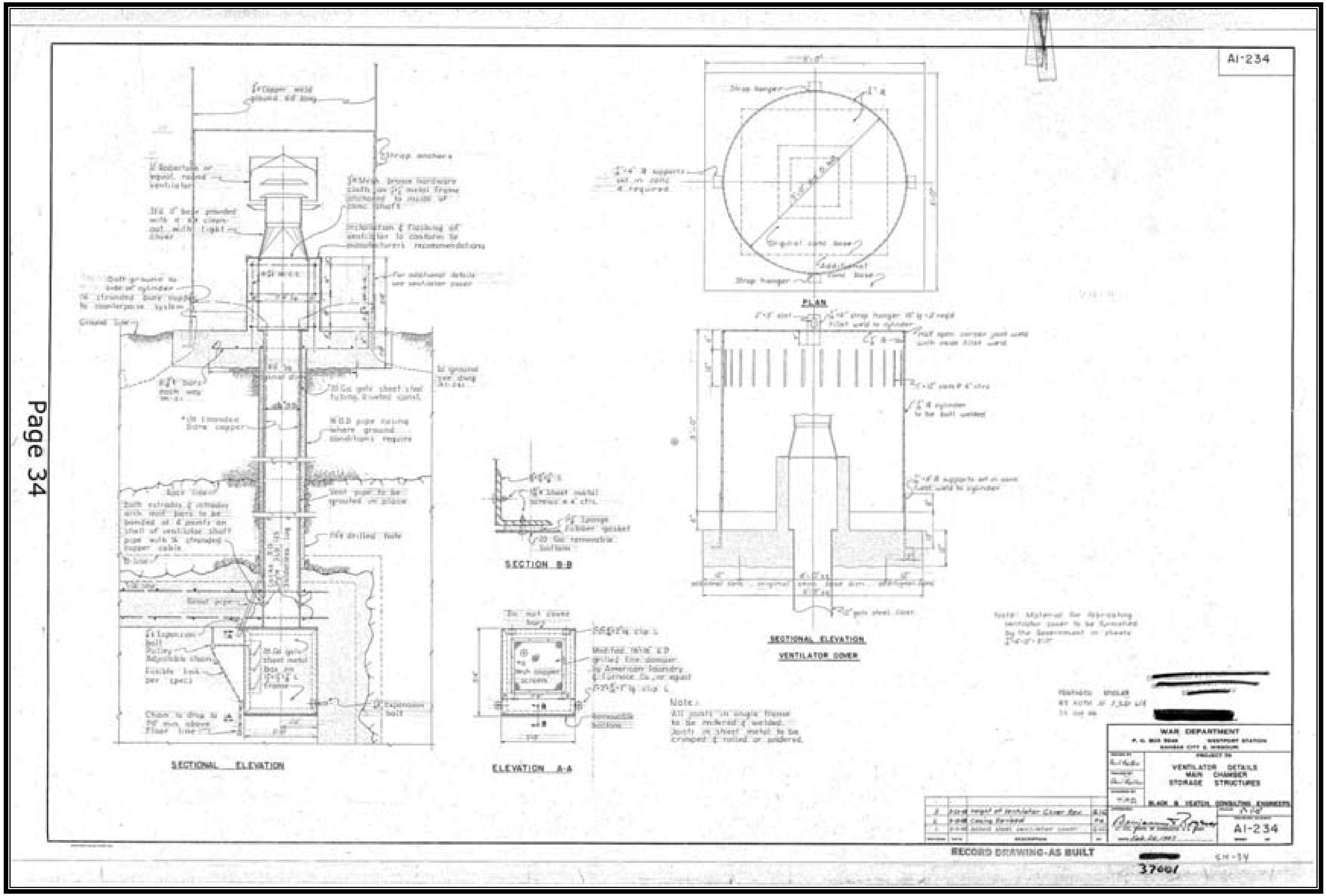

Plate 11 Detail of ventilators installed in both underground storage facilities and Plant 1 (Courtesy Kirtland Air Force Base)

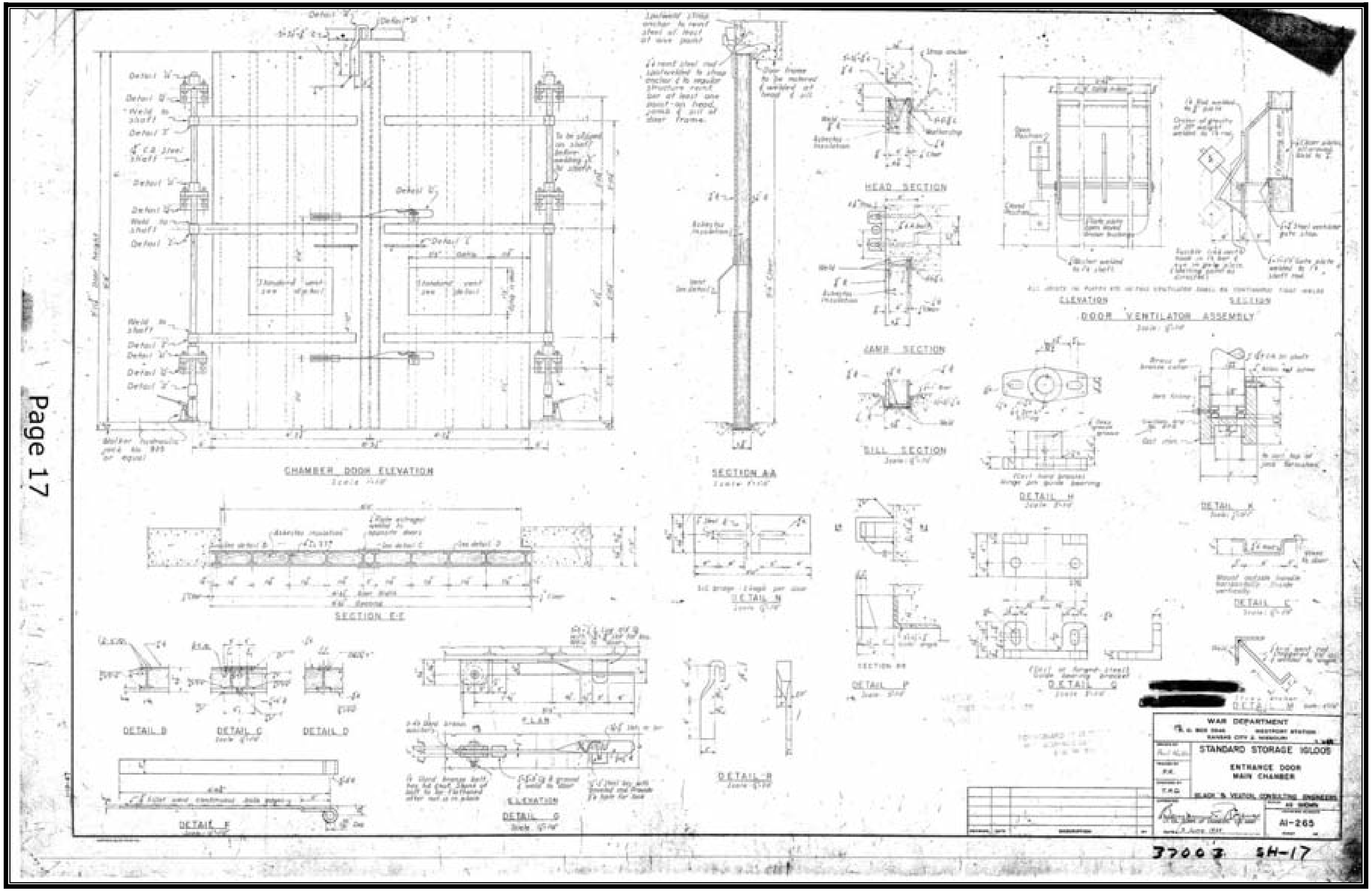

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Plate 12 Detail of doors showing top hook, slip hinges, and hydraulic jack. Note detail of ventilator at upper right illustrating the fusible link (Courtesy Kirtland Air Force Base)

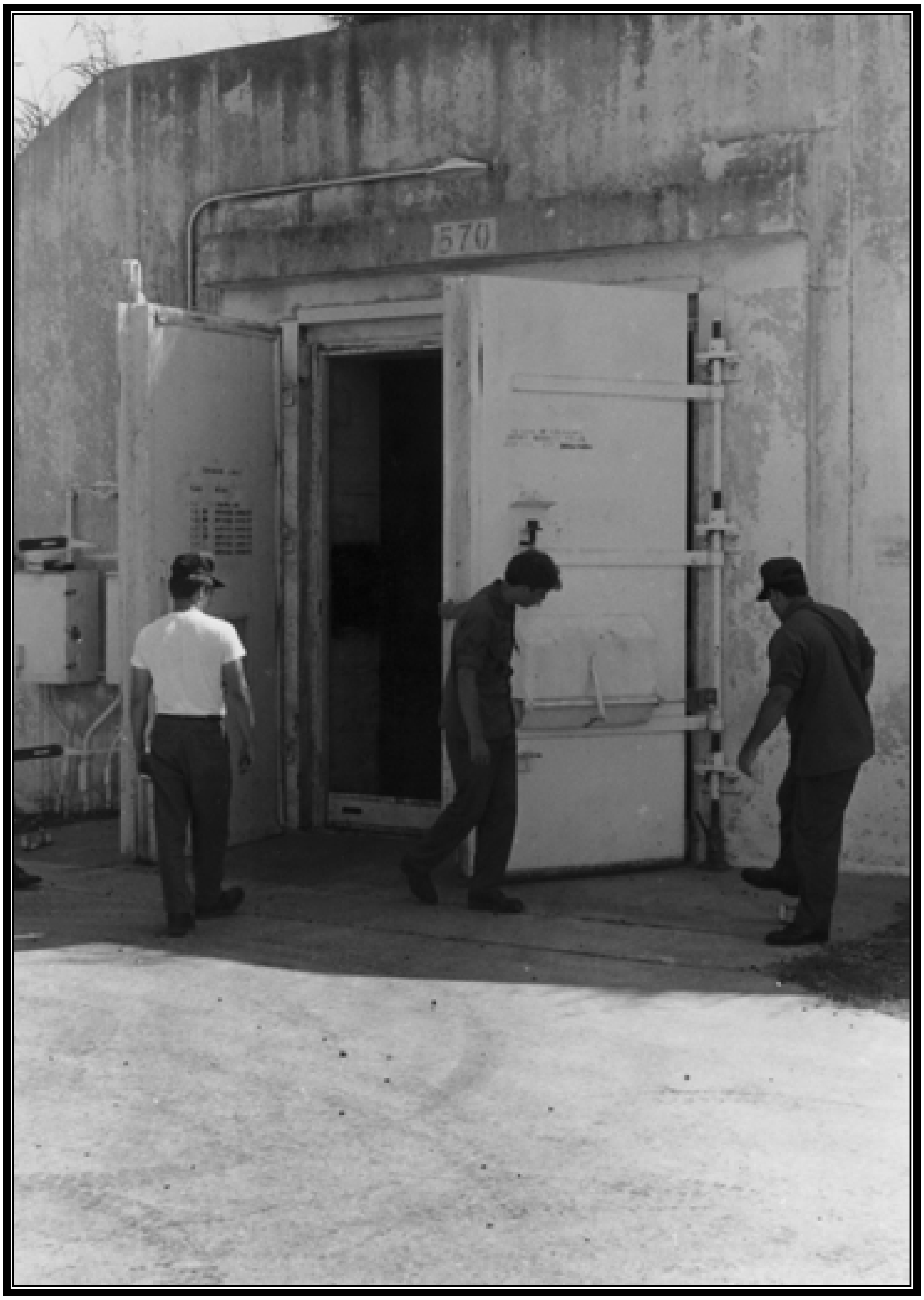

Plate 13 Opening magazine doors with hydraulic jacks (Courtesy Lackland Air Force Base)

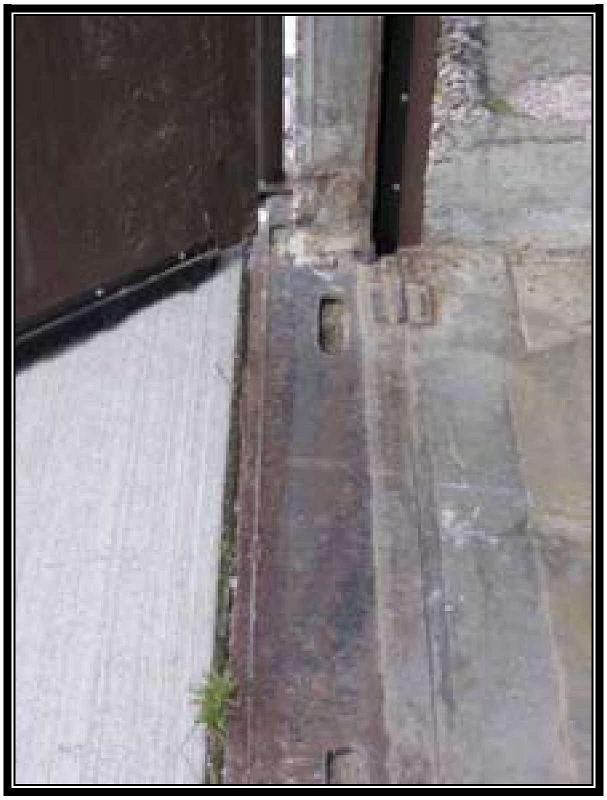

Plate 14 Detail of ramp that covered trench at base of door, Ellsworth Air Force Base (Photograph by RCG&A, 2008)

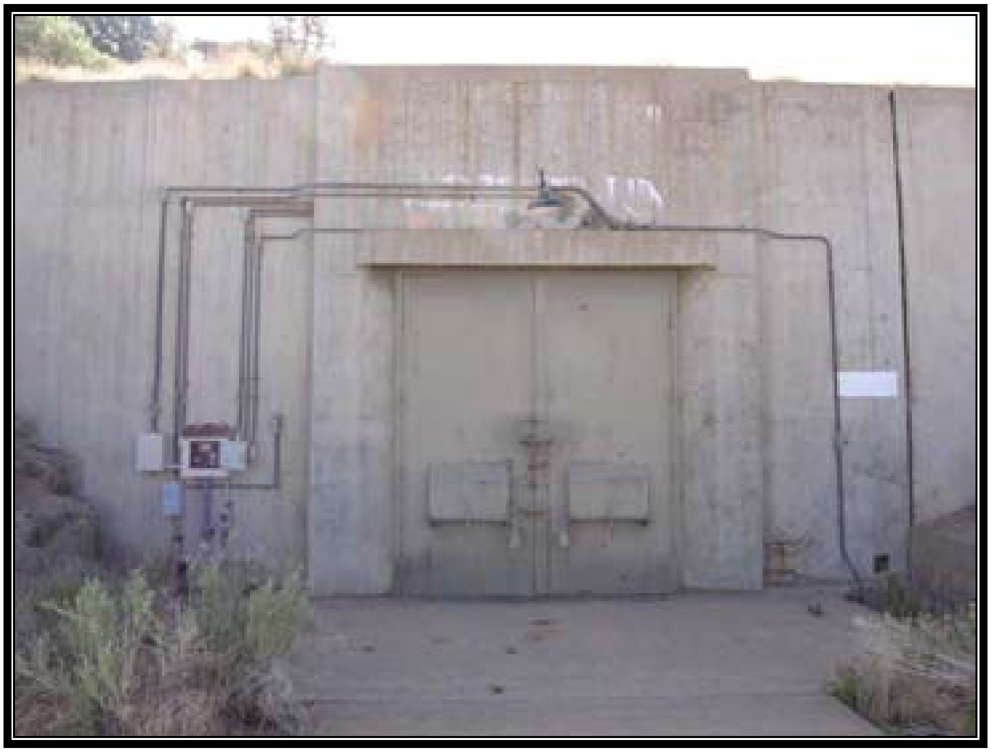

Plate 15 Portal of "Type D" underground magazine (Photograph by RCG&A, 2008)

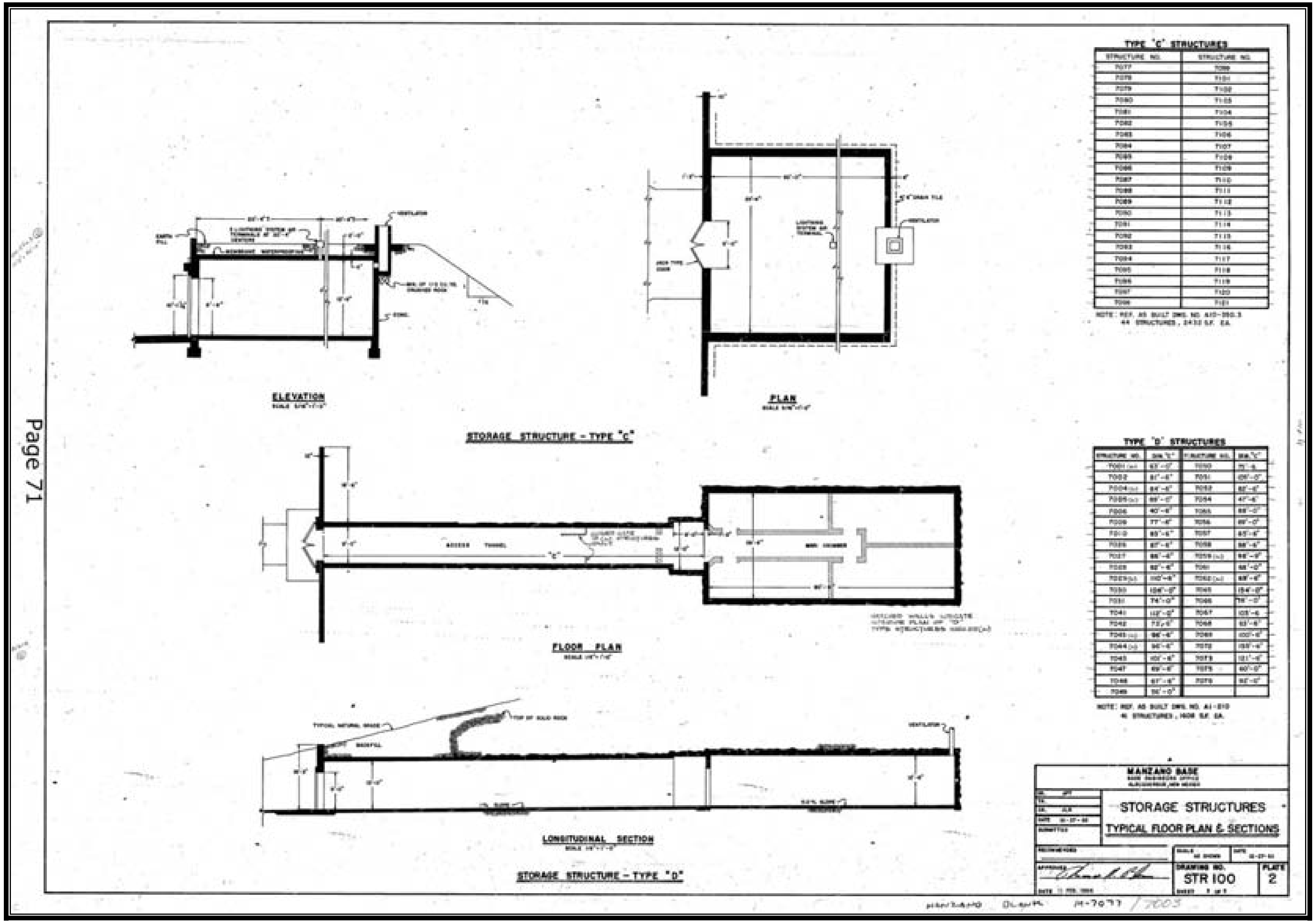

Plate 16 Plan and sections of "Type D" and "Type C" magazines (Courtesy Kirtland Air Force Base)

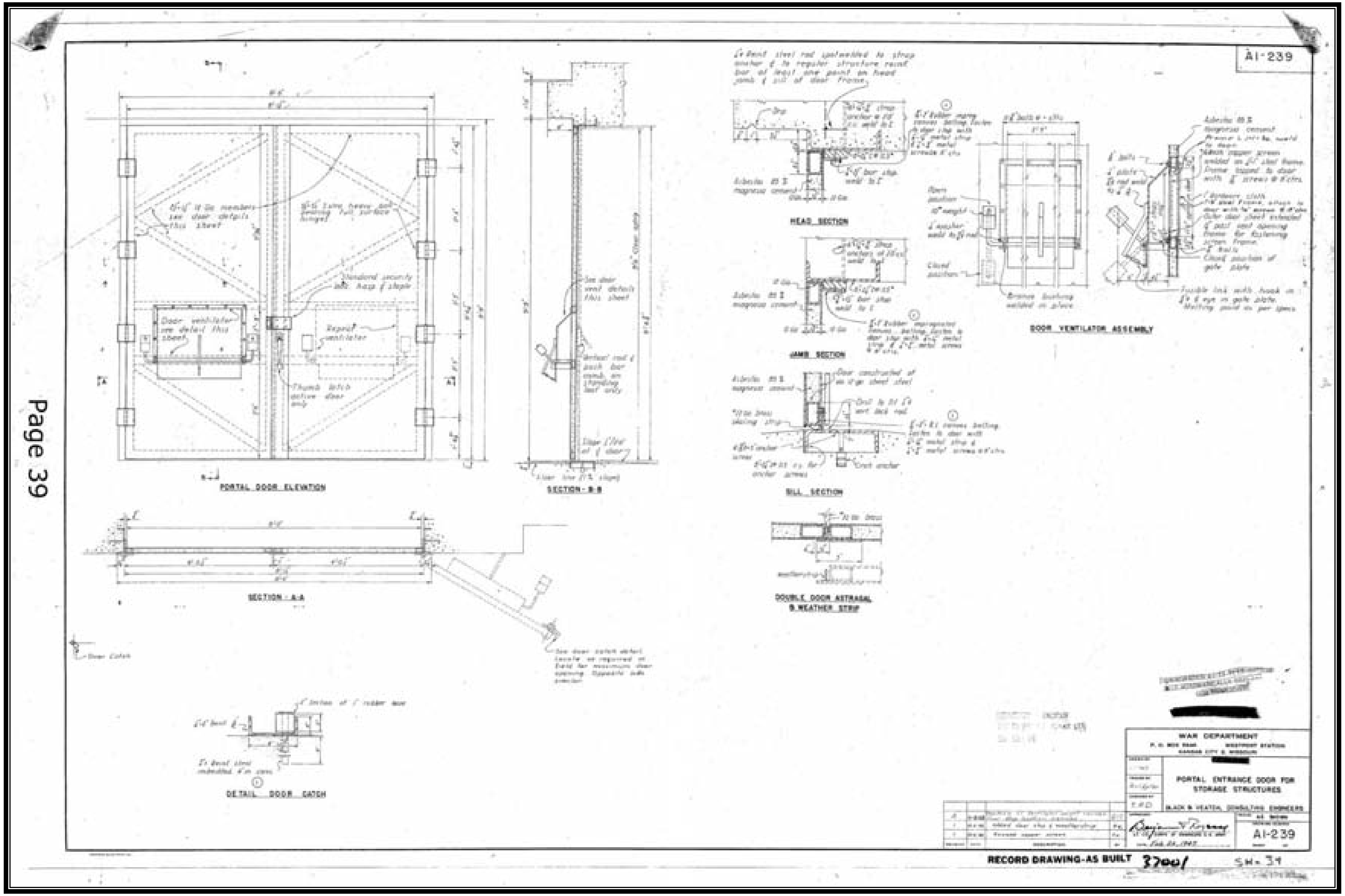

Plate 17 Plans for outer portal doors (Courtesy Kirtland Air Force Base)

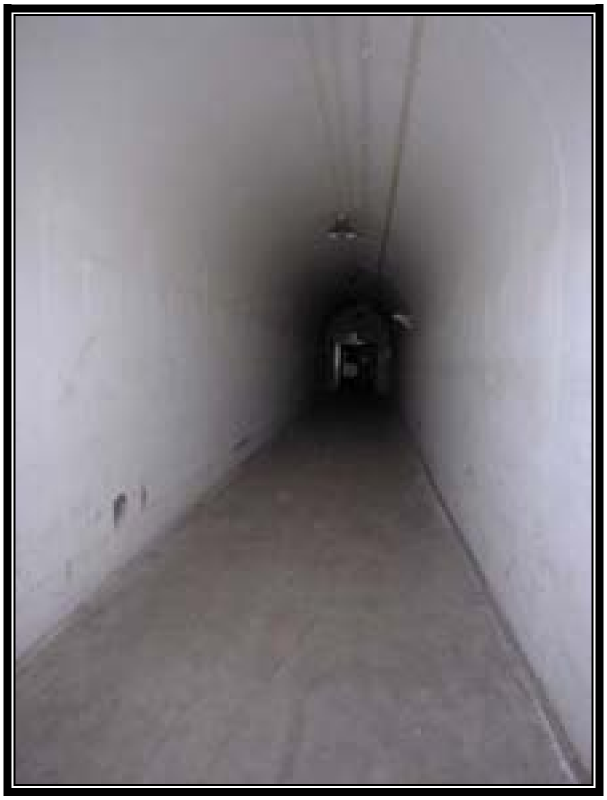

Plate 18 Access tunnel of “Type D” magazine (Photograph by RCG&A, 2008)

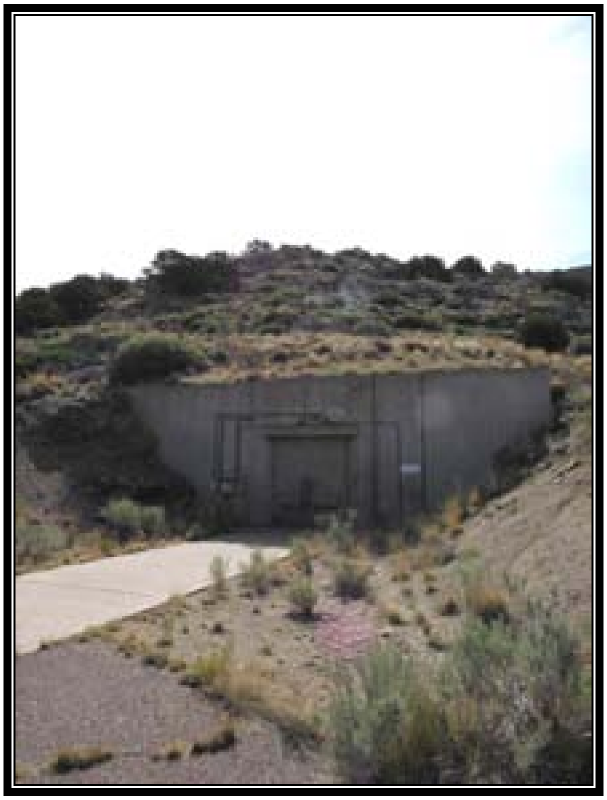

Plate 19 Typical “Type D” magazine showing its mountainside location (Photograph by RCG&A, 2008)

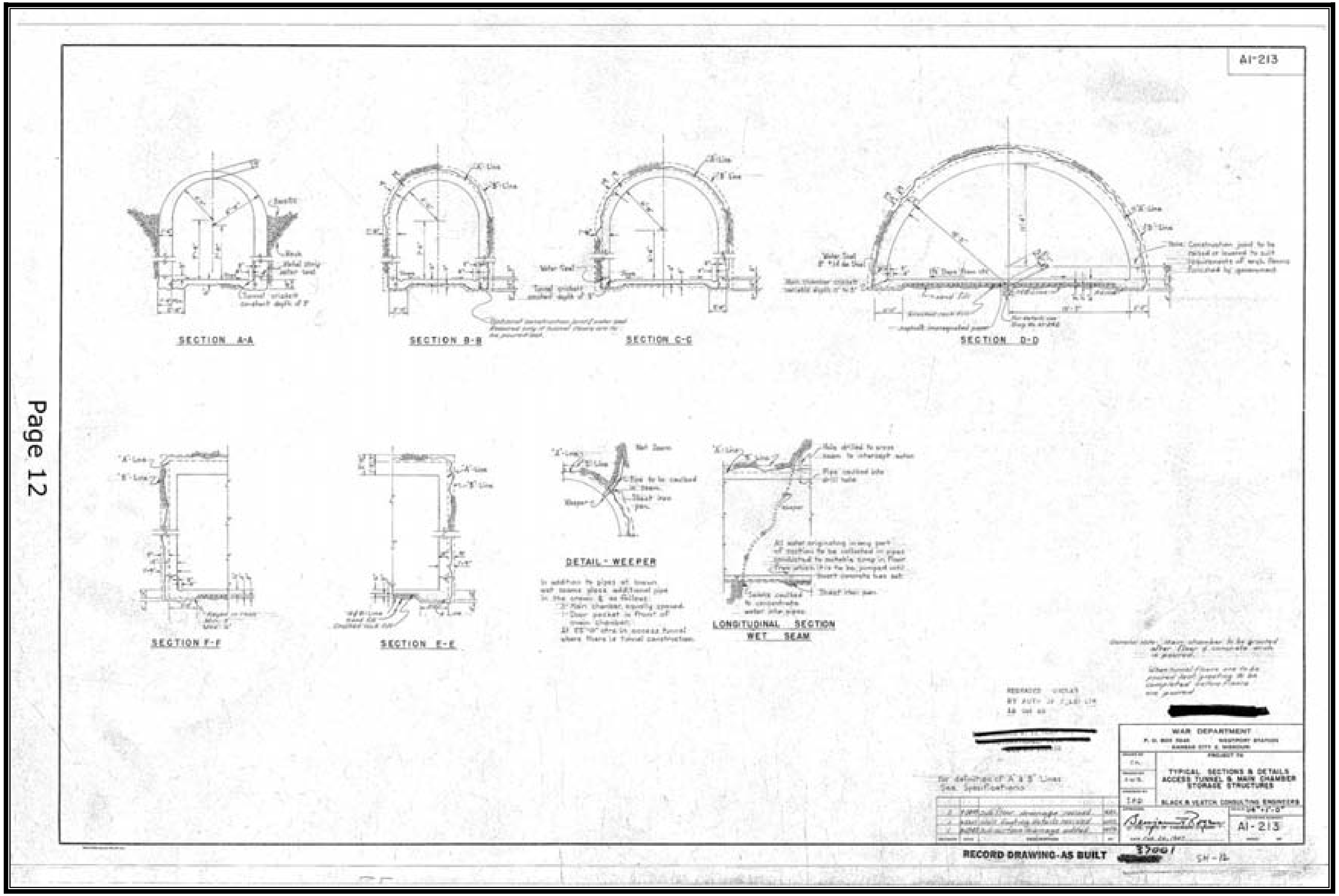

Plate 20 Sections of “Type D” magazine showing different arch configurations for various areas of magazine. Note drainage troughs along both longitudinal walls (Courtesy Kirtland Air Force Base)

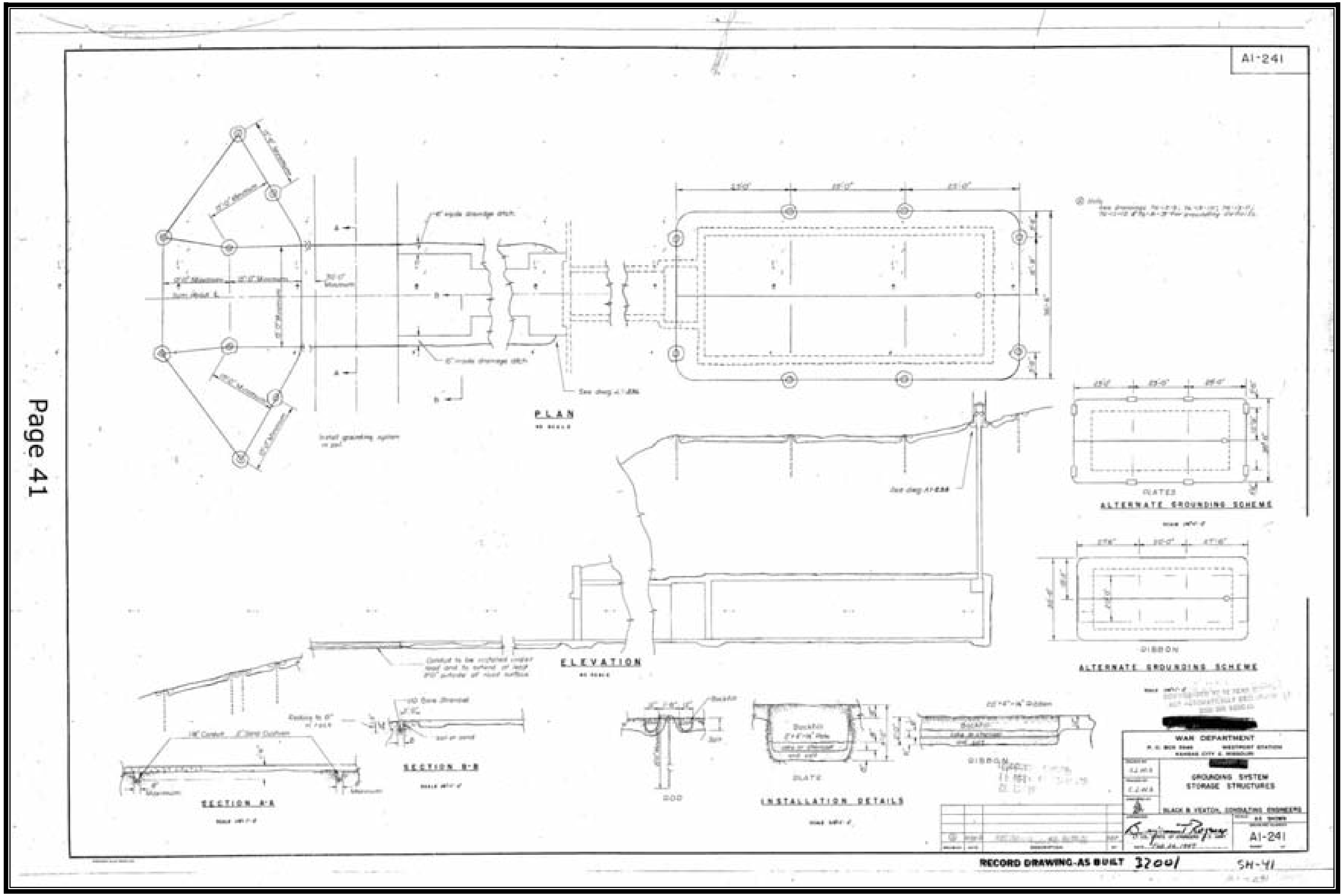

Plate 21 Grounding plan for underground magazines (Courtesy Kirtland Air Force Base)

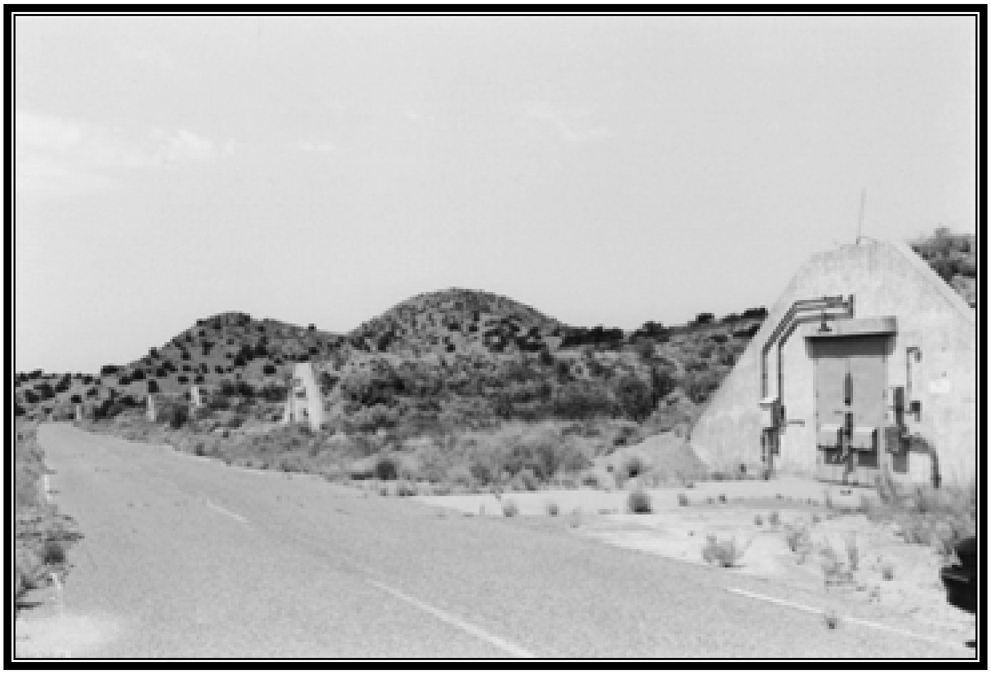

Plate 22 “Type B” magazines, ca. 1995 (Courtesy Kirtland Air Force Base)

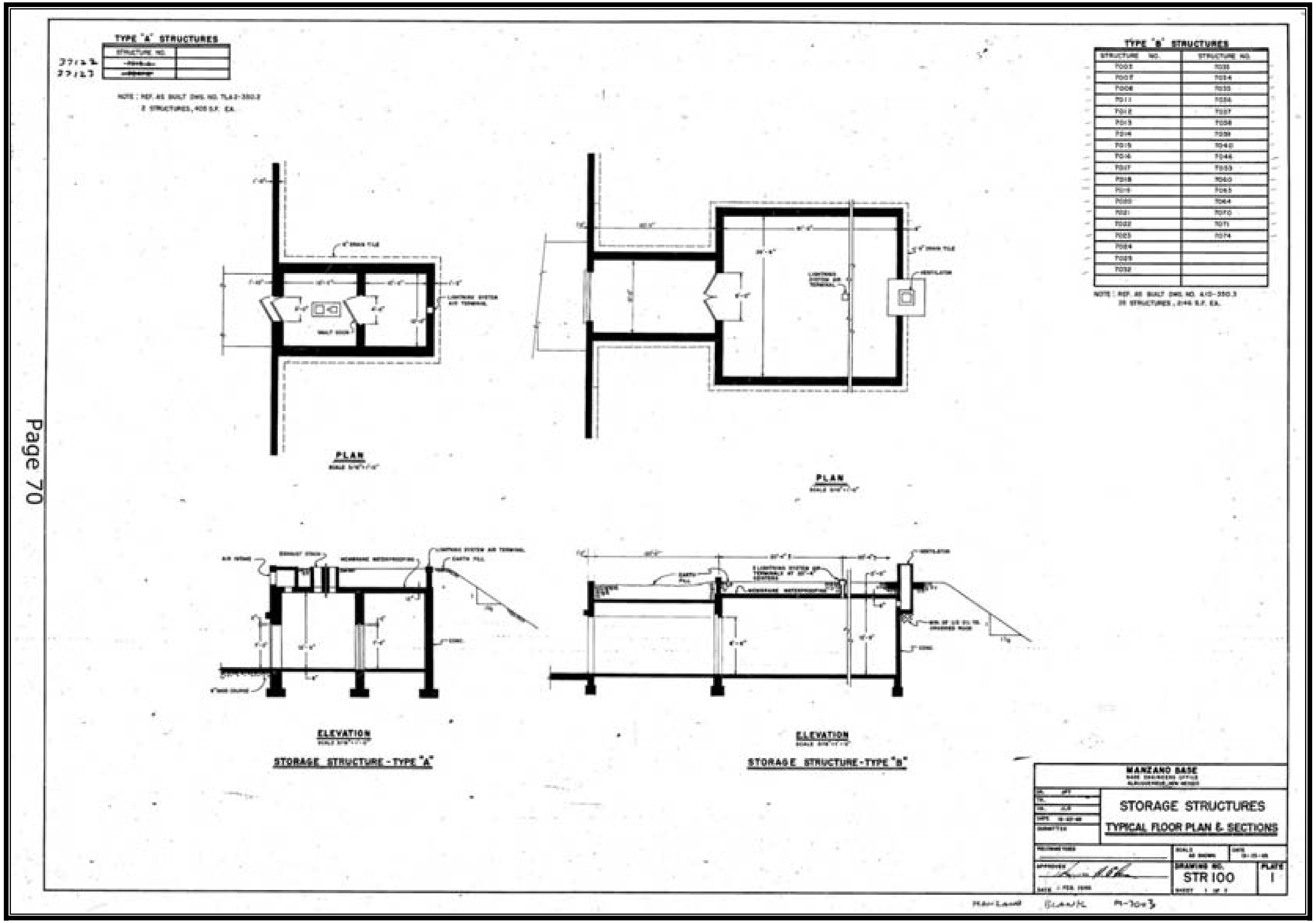

Plate 23 Plans and sections of "Type A" and "Type B (Type VI)" magazines (Courtesy Kirtland Air Force Base)

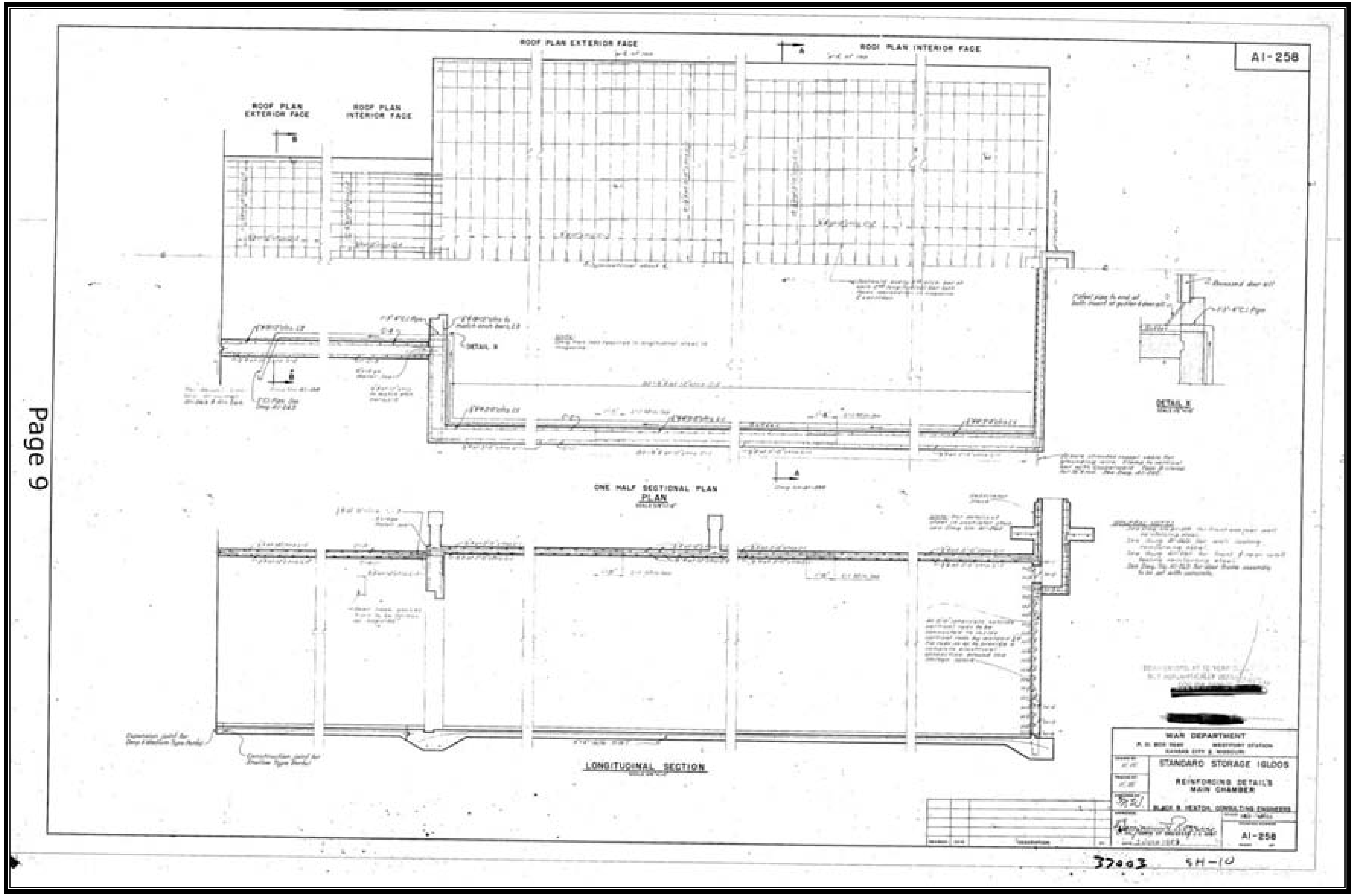

Plate 24 Section drawings of “Type B” magazines (Courtesy Kirtland Air Force Base)

Plate 25 Side view of “Type B” magazines (Photograph by RCG&A, 2008)

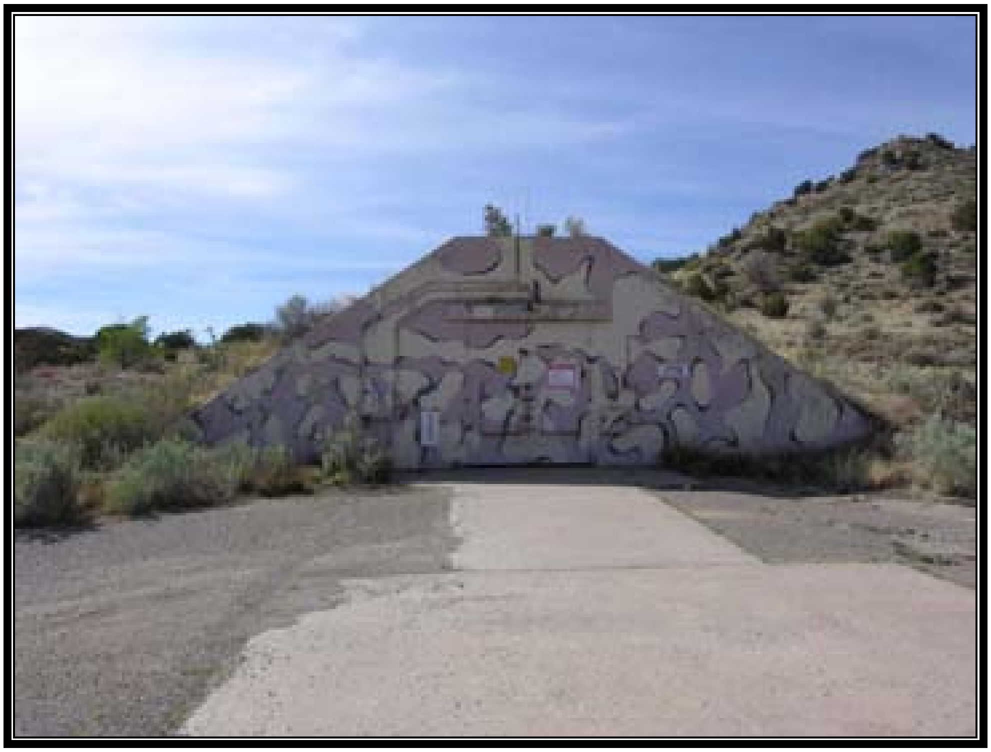

Plate 26 Portal of “Type B” magazine (Photograph by RCG&A, 2008)

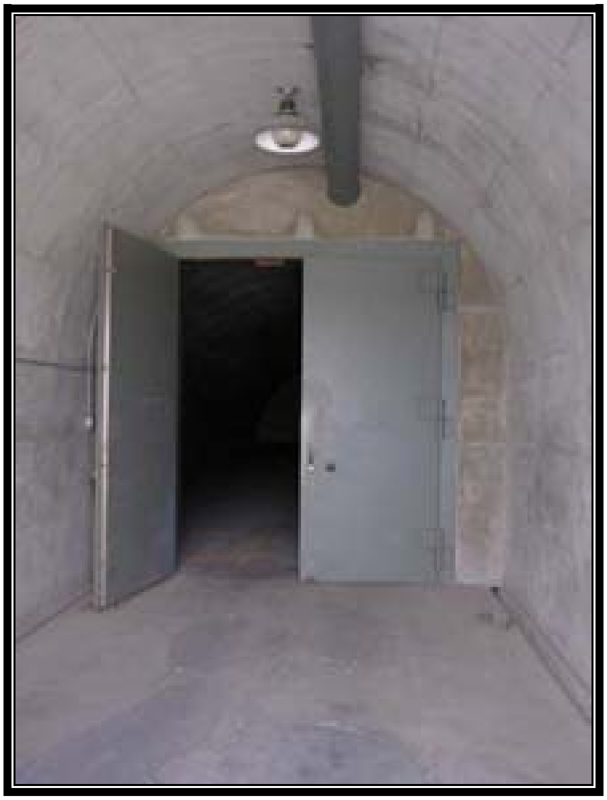

Plate 27 Typical inner chamber of “Type B” magazine, Ellsworth Air Force Base (Photograph by RCG&A, 2008)

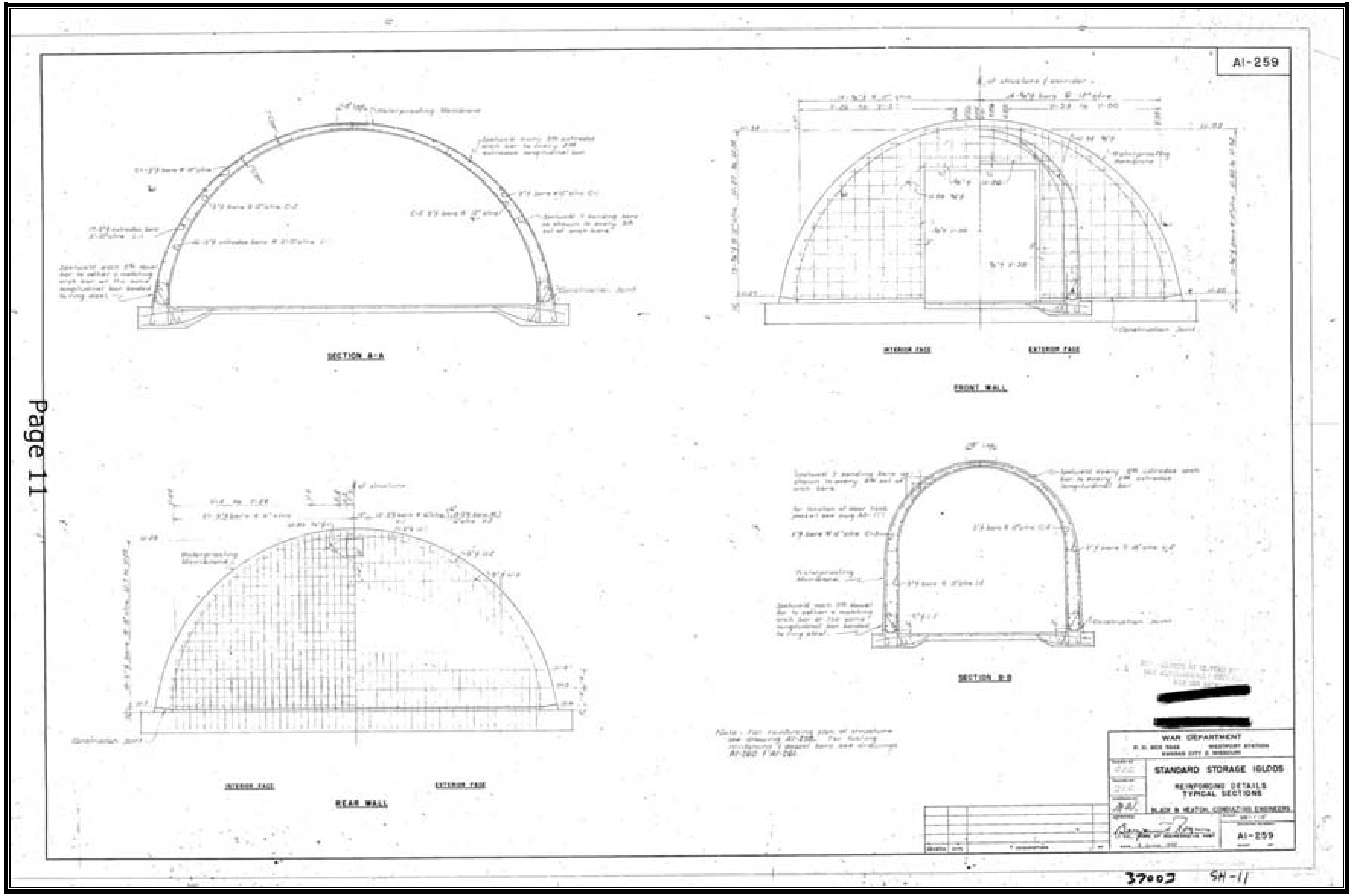

Plate 28 Sectional details of “Type B” magazine (Courtesy Kirtland Air Force Base)

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Plate 29 Manzano Base showing locations of original underground and earth-covered magazines (Courtesy Kirtland Air Force Base)

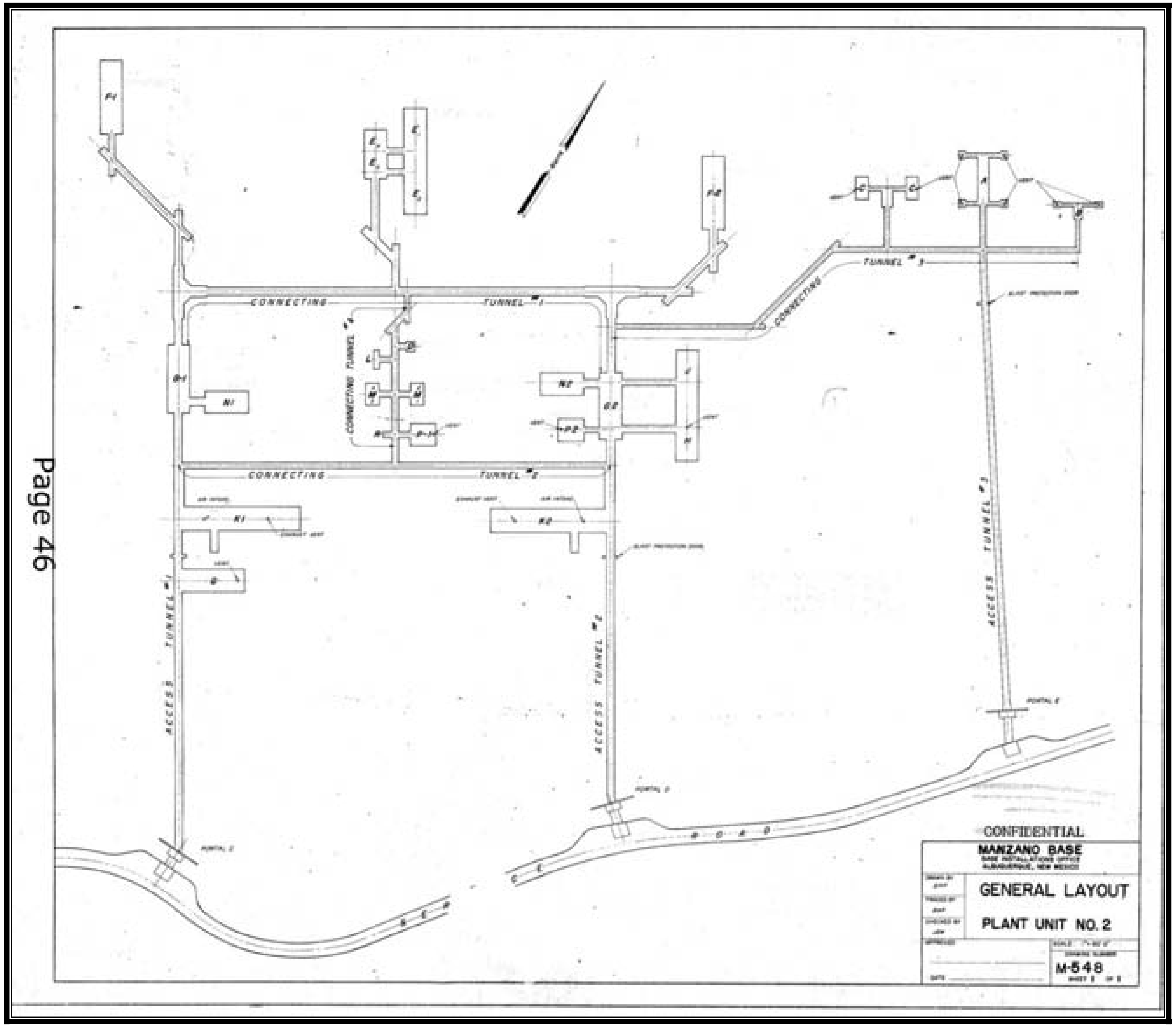

Plate 30 Schematic layout of Plant 2 (Courtesy Kirtland Air Force Base)

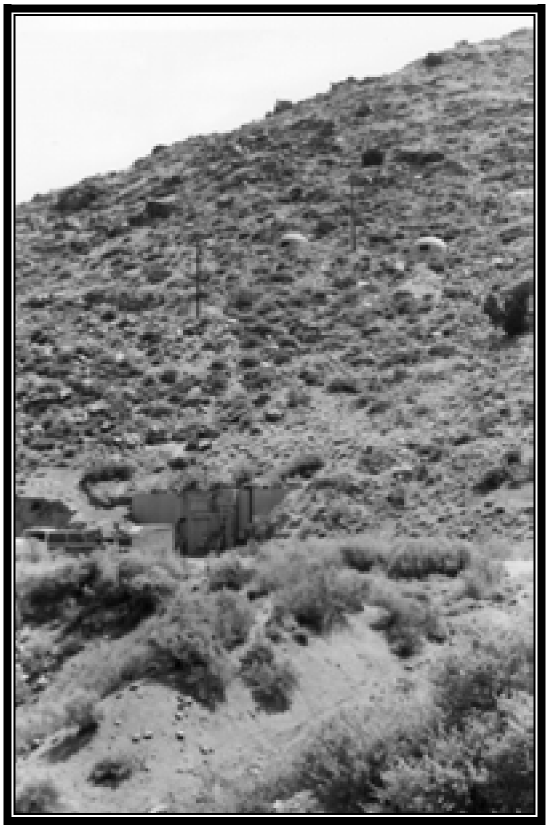

Plate 31 Entry portal of Plant 2, ca. 1995 (Courtesy Kirtland Air Force Base)

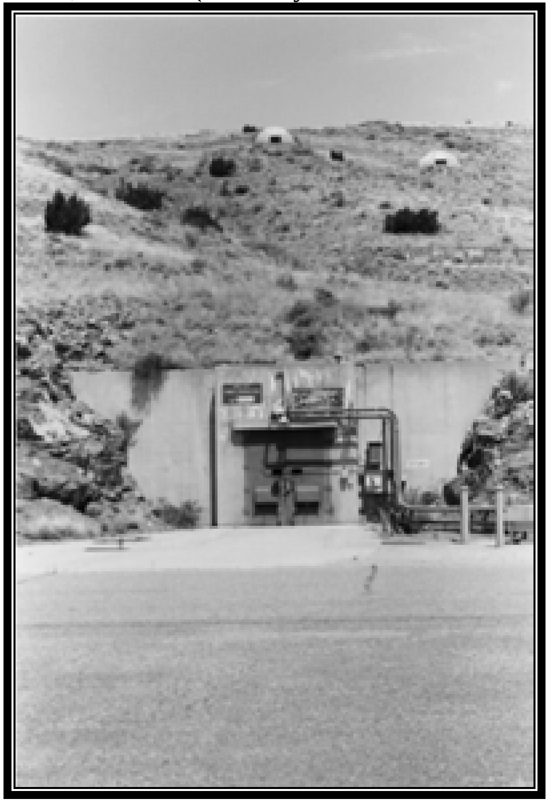

Plate 32 Entry portal of Plant 2, ca. 1995. Note ventilators on hillside (Courtesy Kirtland Air Force Base)

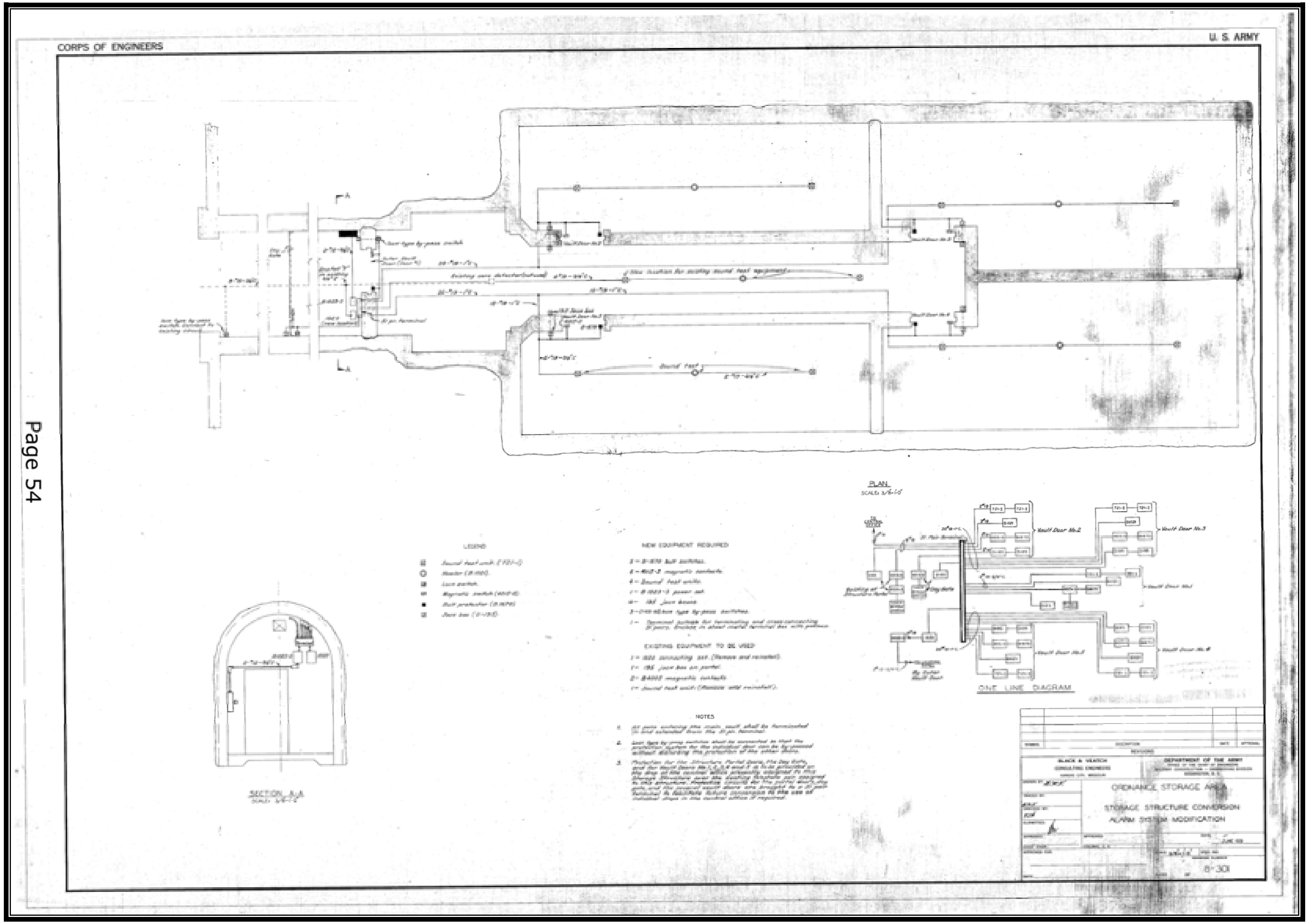

Plate 33 Construction drawing showing modification to “Type D” structure for conversion to “A Structure” (Courtesy Kirtland Air Force Base)

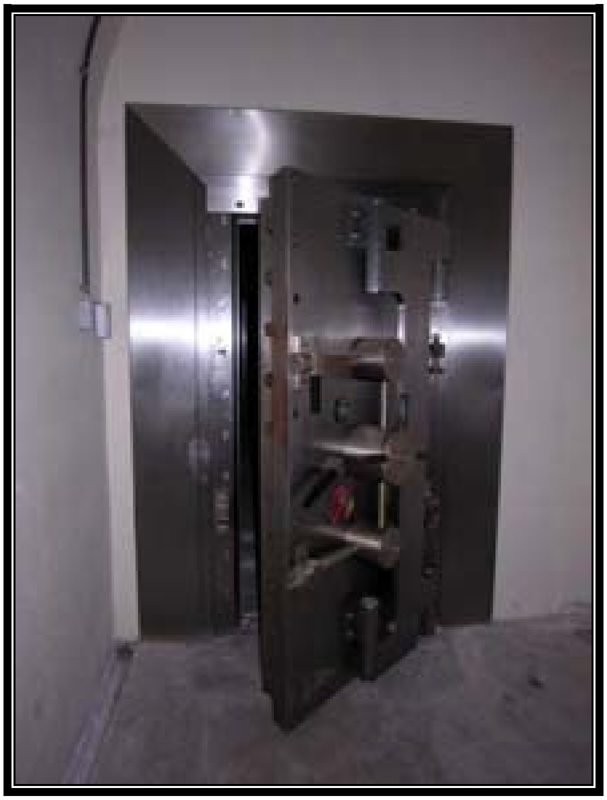

Plate 34 Dual combination vault door installed during conversion to “A Structure” (Photograph by RCG&A, 2008)

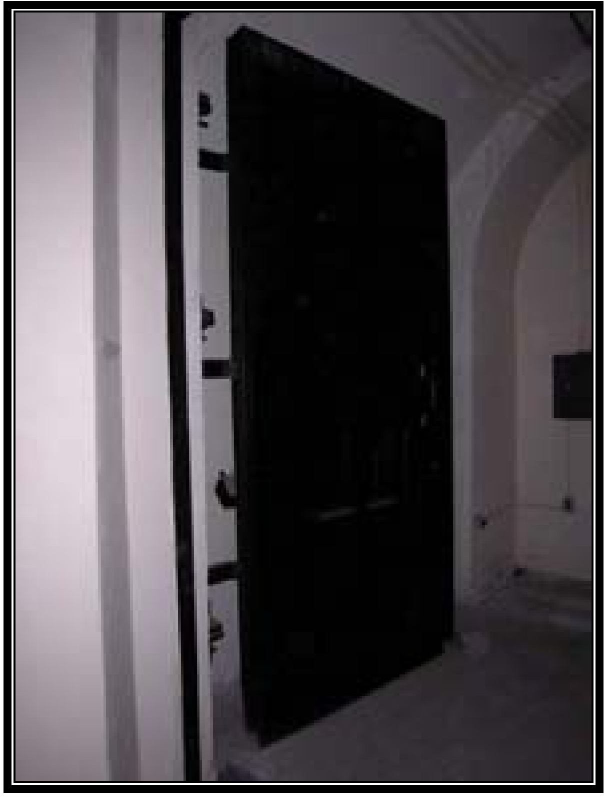

Plate 35 Blast door “Type D” magazine (Photograph by RCG&A, 2008)

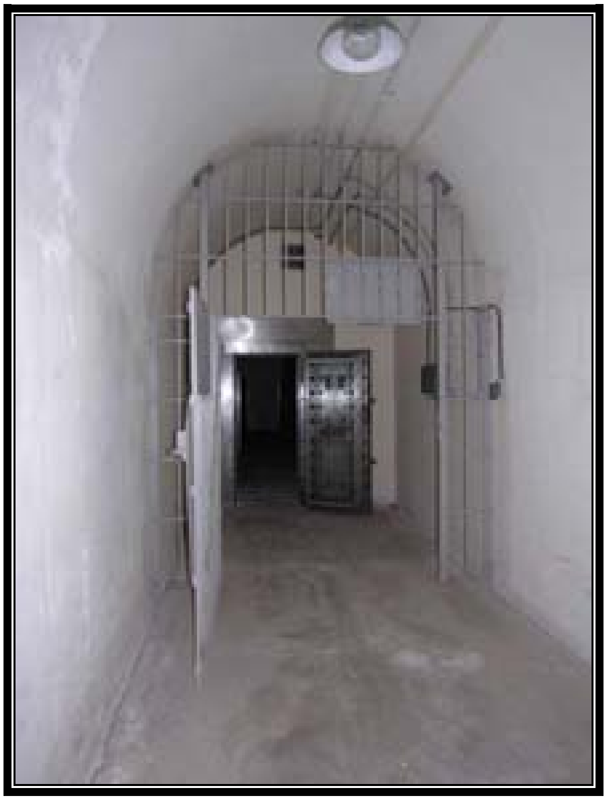

Plate 36 Security gate of converted "Type D" magazine (Photograph by RCG&A, 2008)

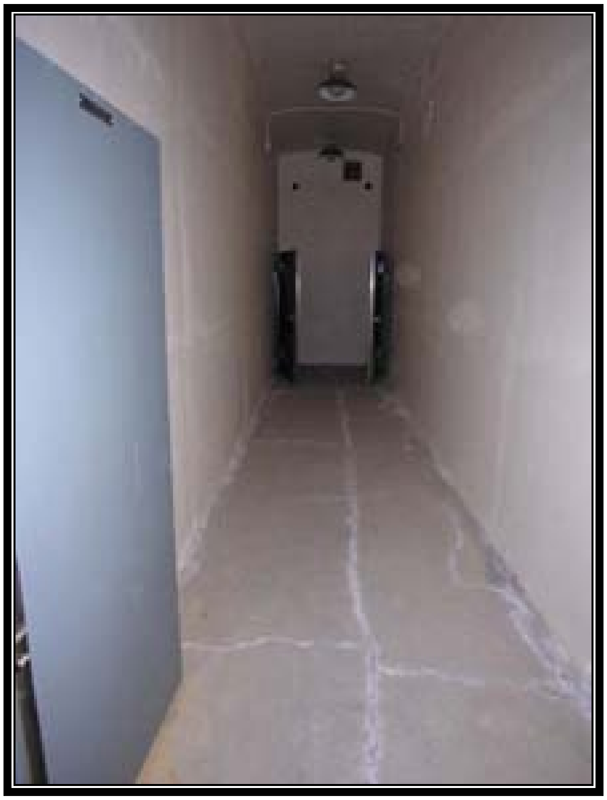

Plate 37 Interior corridor for access to storage cells (Photograph by RCG&A, 2008)

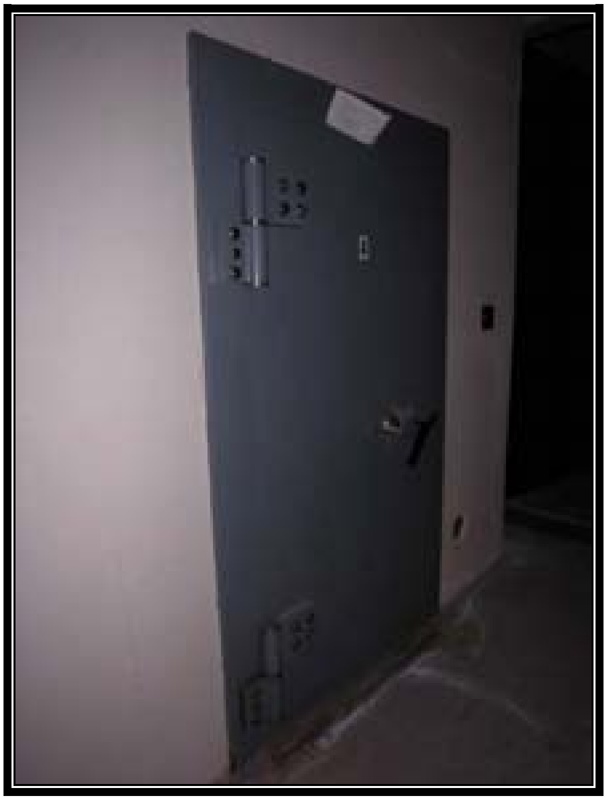

Plate 38 Typical single combination door at entry to storage cell (Photograph by RCG&A, 2008)

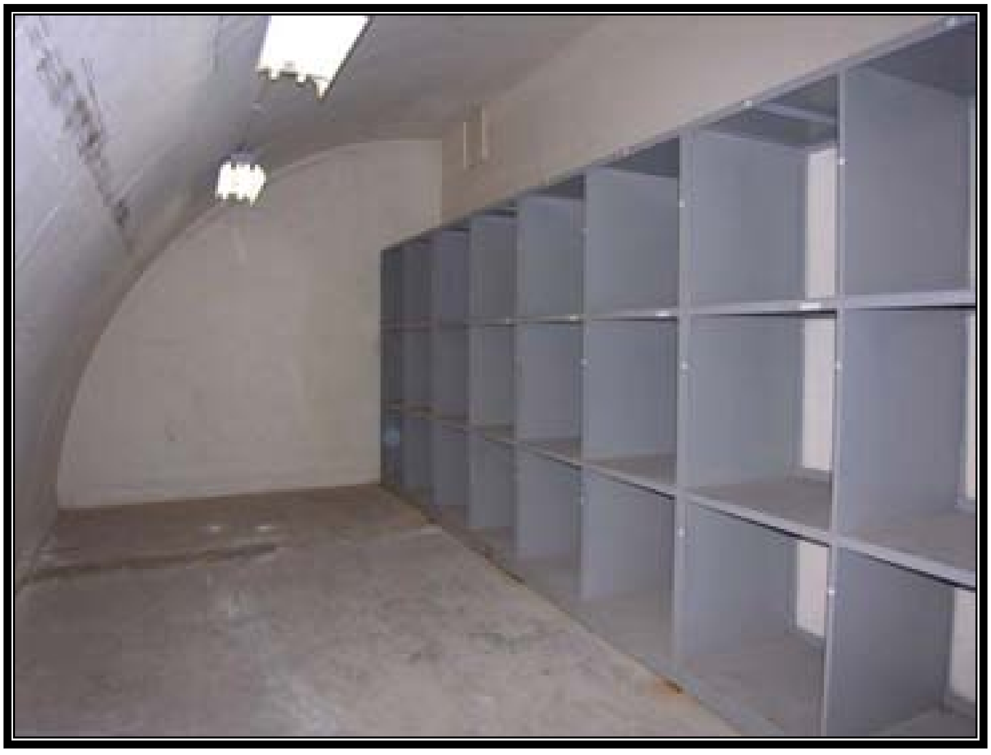

Plate 39 Steel shelving in converted “Type D” magazine (Photograph by RCG&A, 2008)

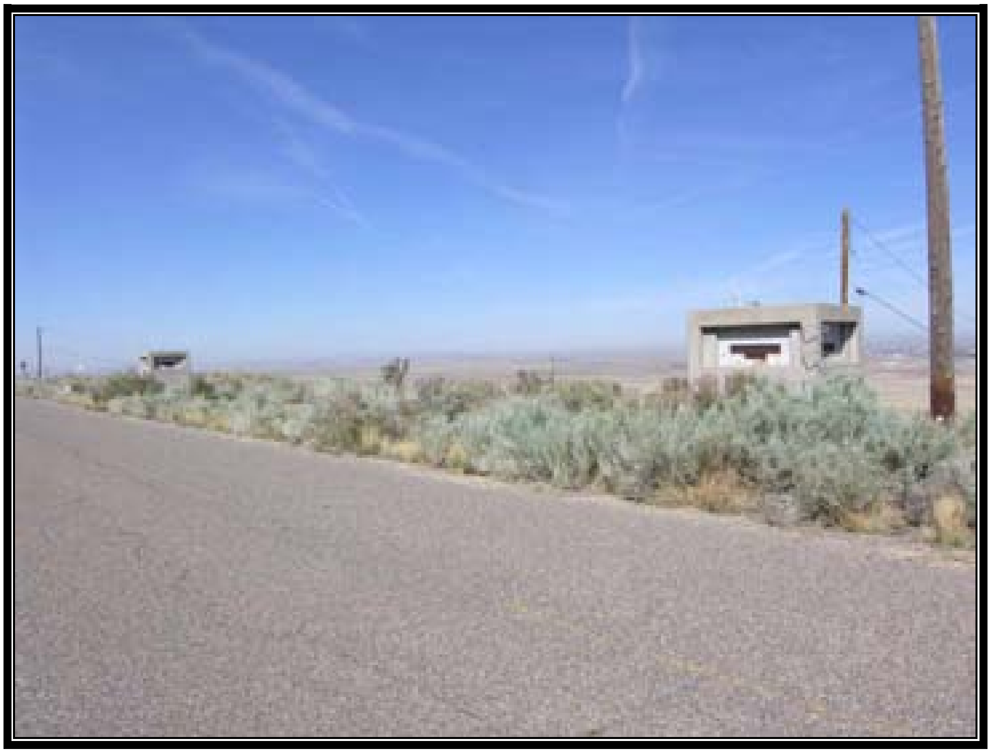

Plate 40 Pillboxes constructed opposite portals to converted “Type D” magazines (Photograph by RCG&A, 2008)

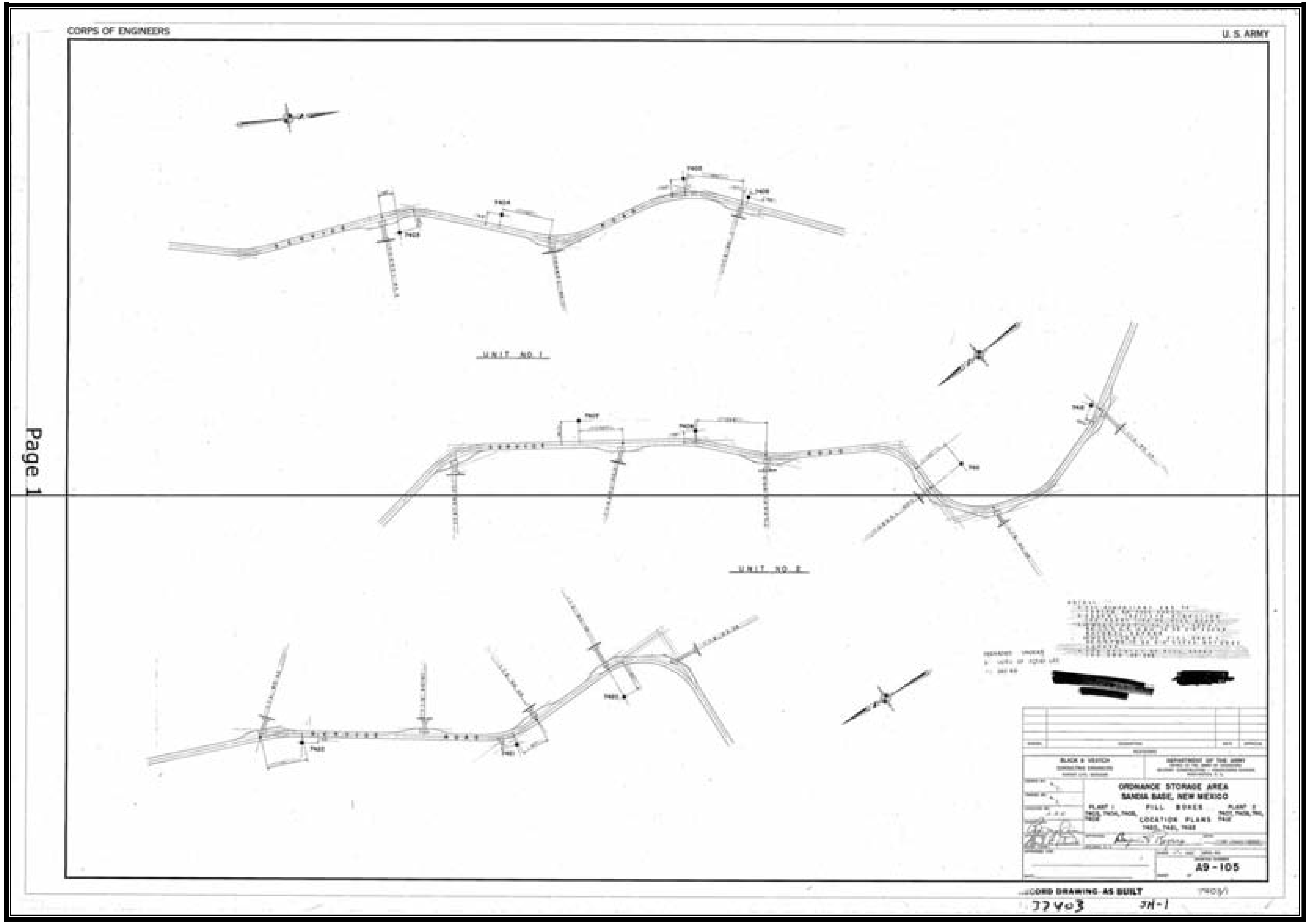

Plate 41 Plan illustrating locations of pillboxes (Courtesy Kirtland Air Force Base)

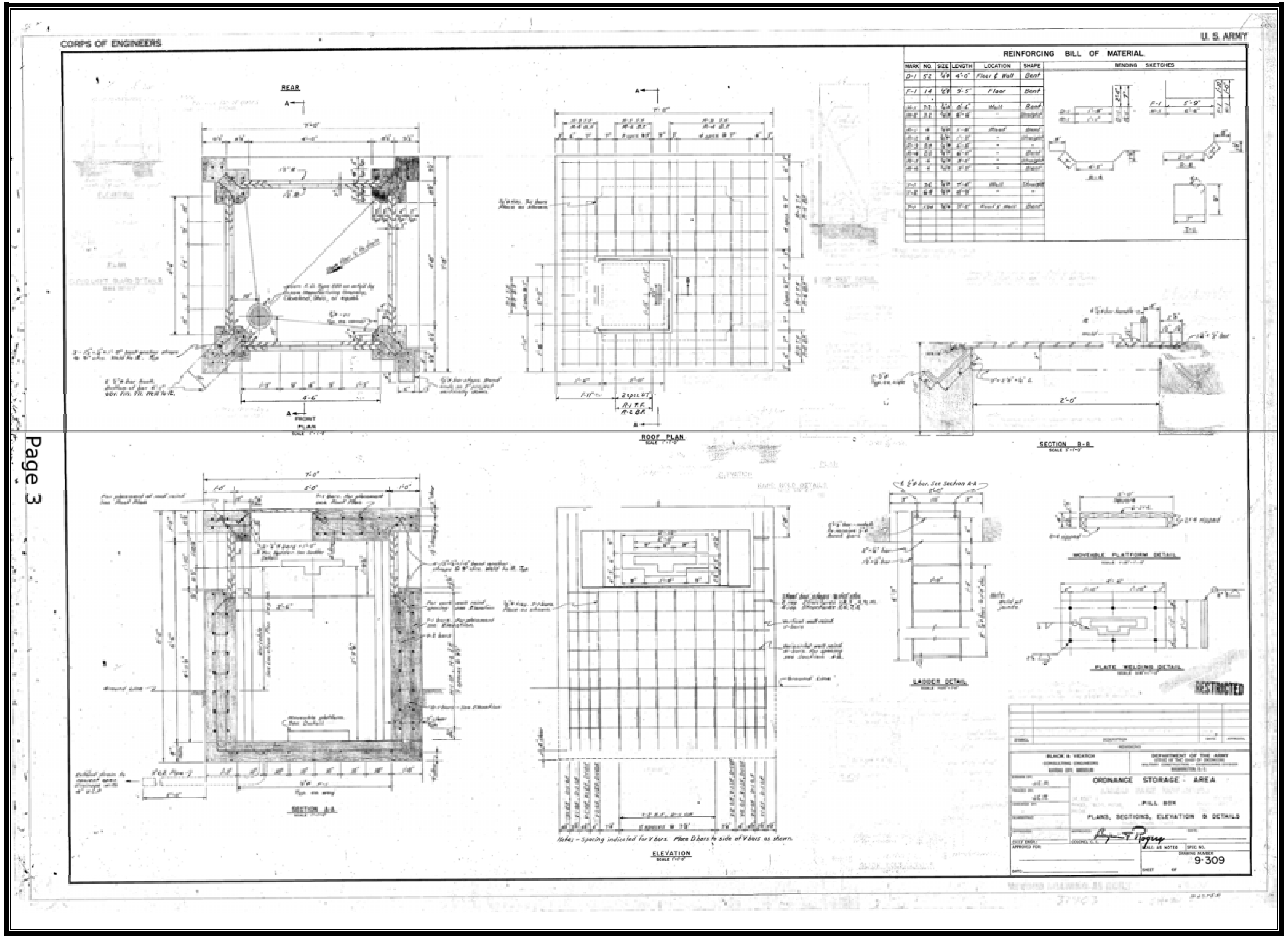

Plate 42 Plans for pillboxes (Courtesy Kirtland Air Force Base)

Plate 43 Reinforced concrete security forces building opposite entry to Plant 1, ca. 1995 (Courtesy Kirtland Air Force Base)

Plate 44 Early fusion type, thermonuclear weapons, the Mk-17 (Courtesy Ellsworth Air Force Base)

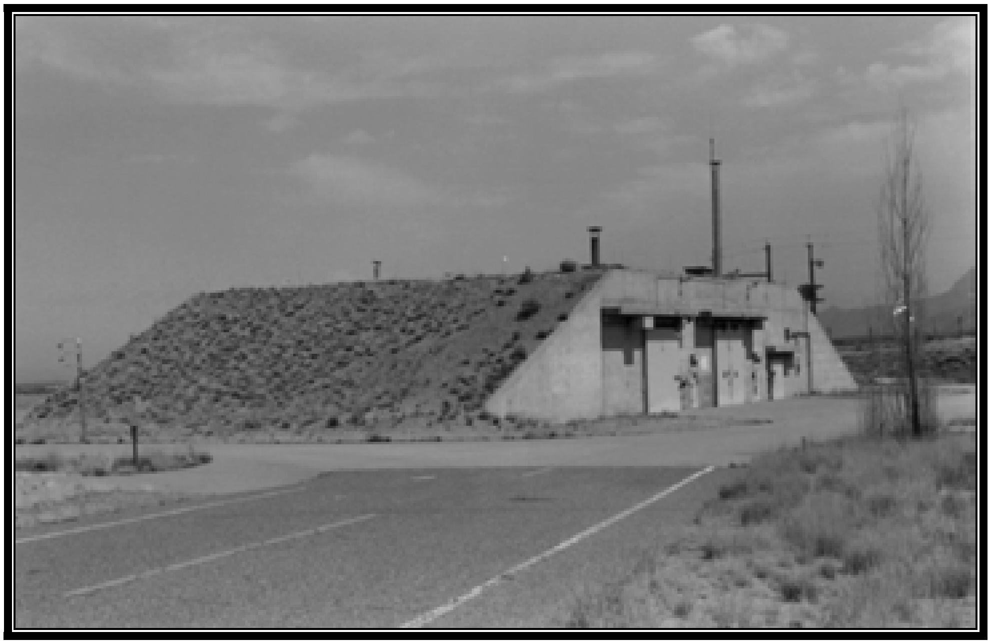

Plate 45 Plant 3, ca. 1995 (Courtesy Kirtland Air Force Base)

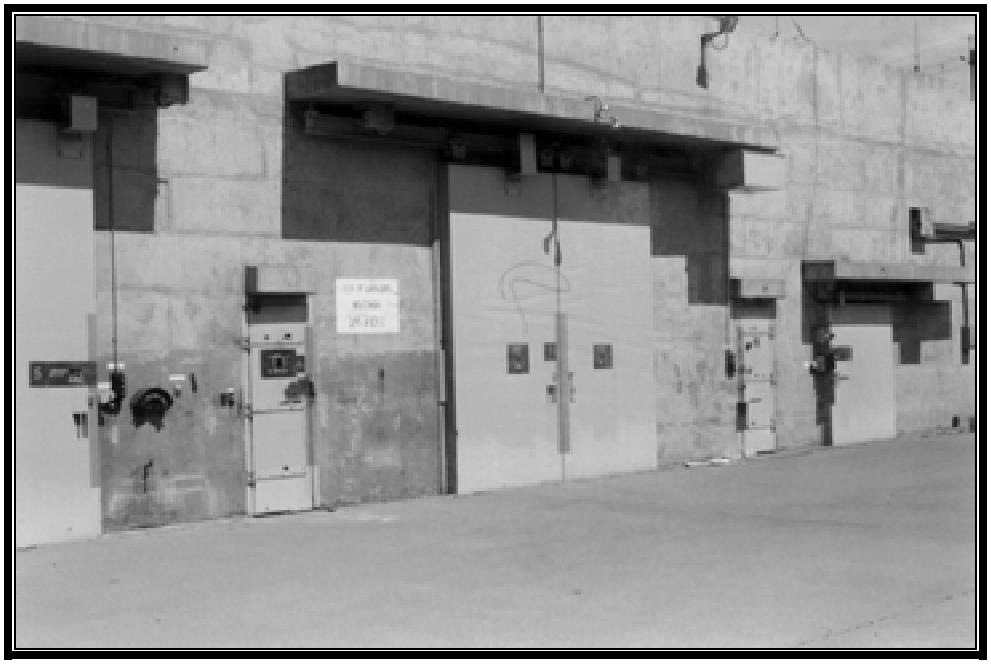

Plate 46 Portal doors of Plant 2, ca. 1995 (Courtesy Kirtland Air Force Base)

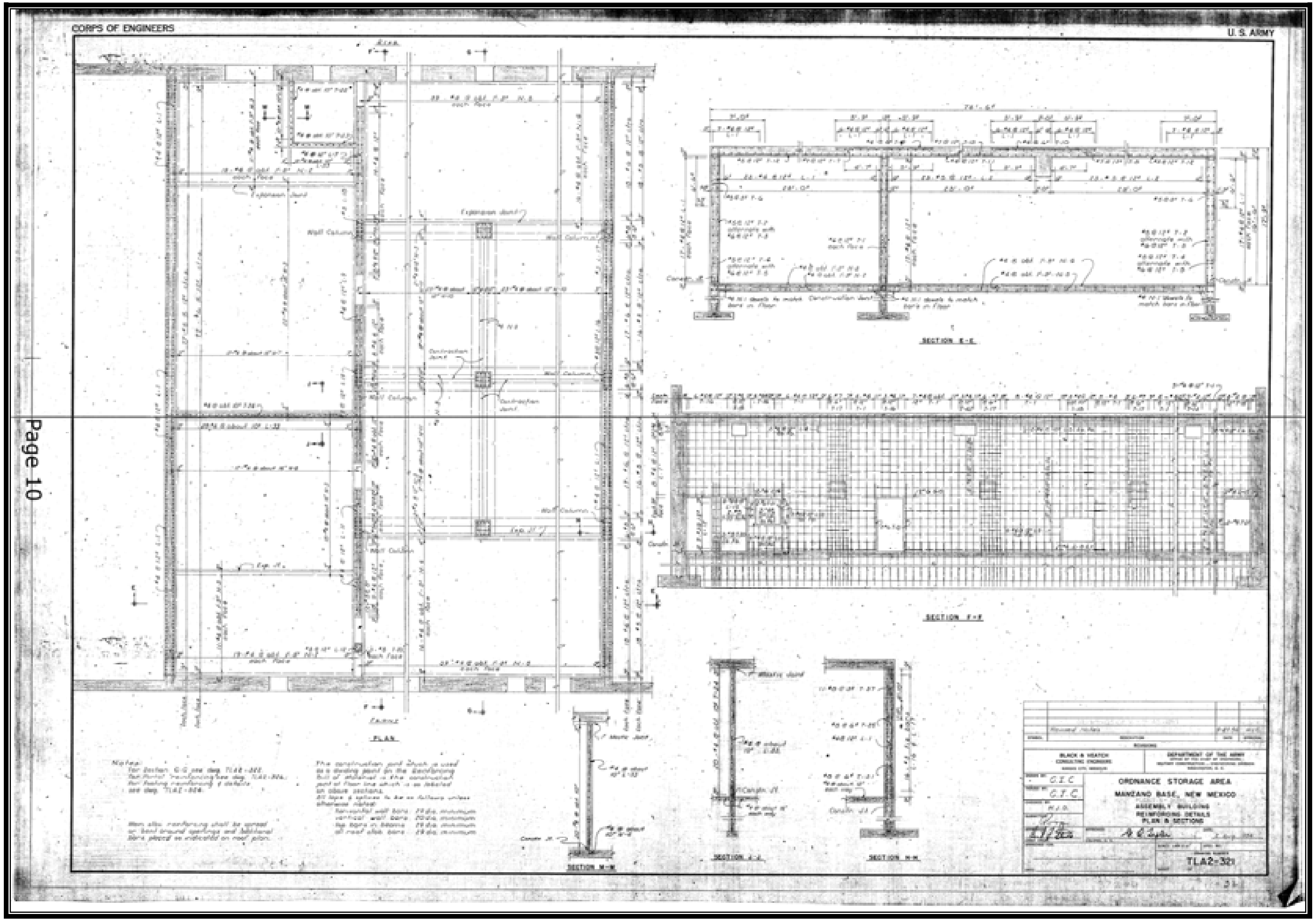

Plate 47 Plans for Plant 3 (Courtesy Kirtland Air Force Base)

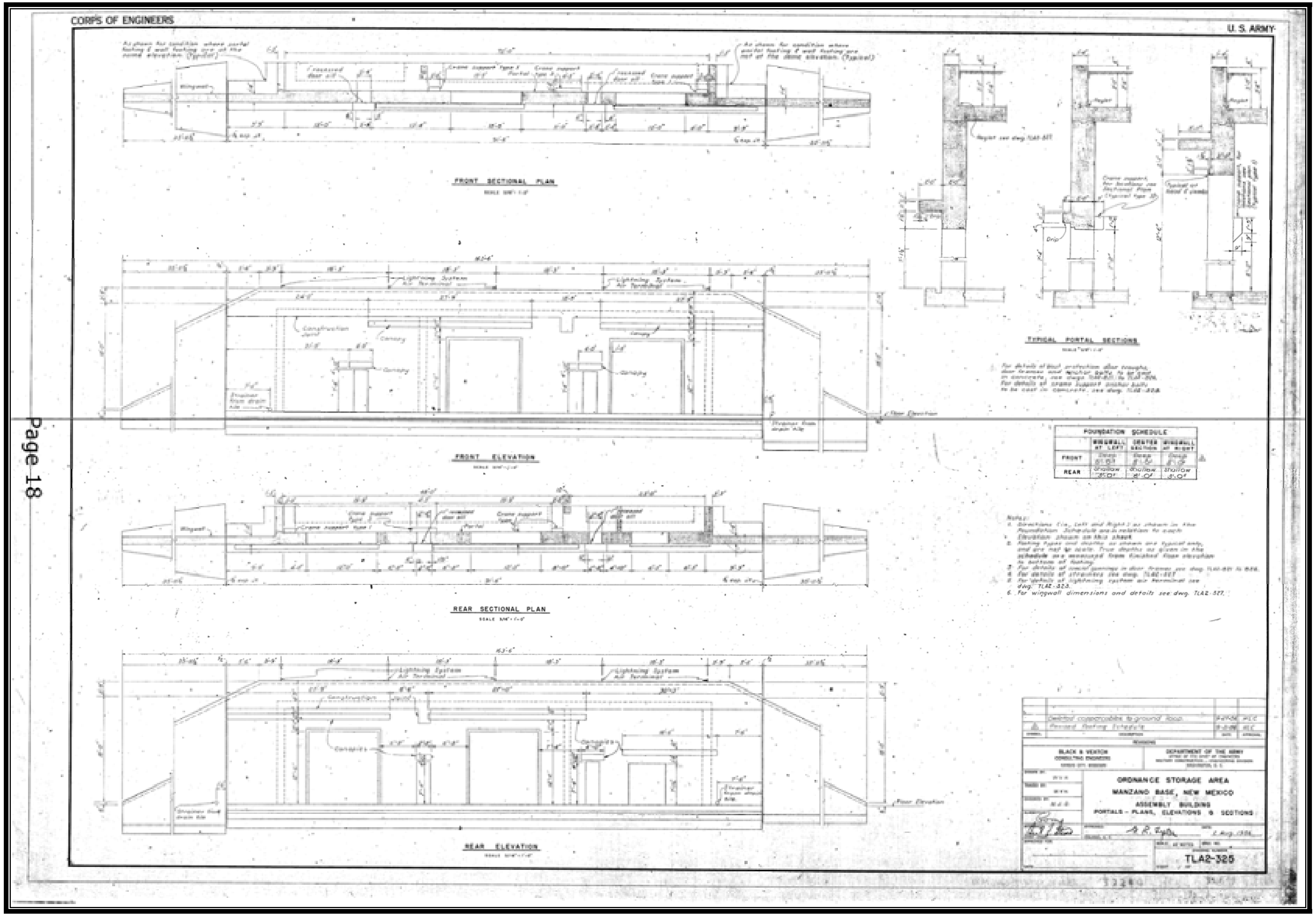

Plate 48 Portal details showing openings on front and rear of Plant 3 (Courtesy Kirtland Air Force Base)

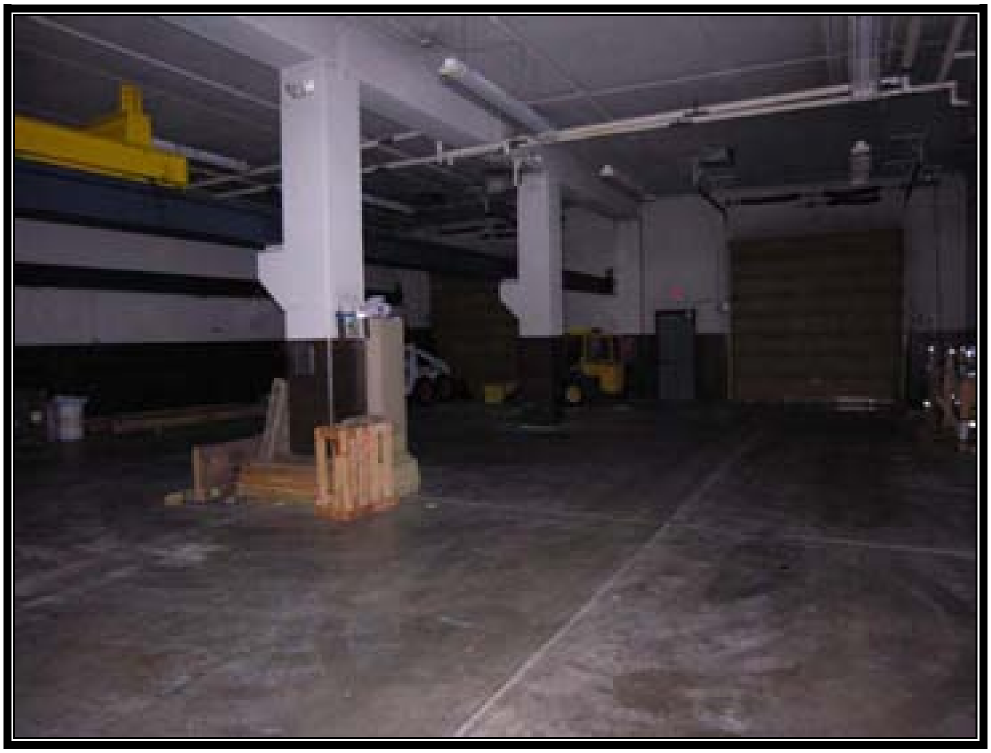

Plate 49 Interior of typical assembly plant, Ellsworth Air Force Base (Photograph by RCG&A, 2008)

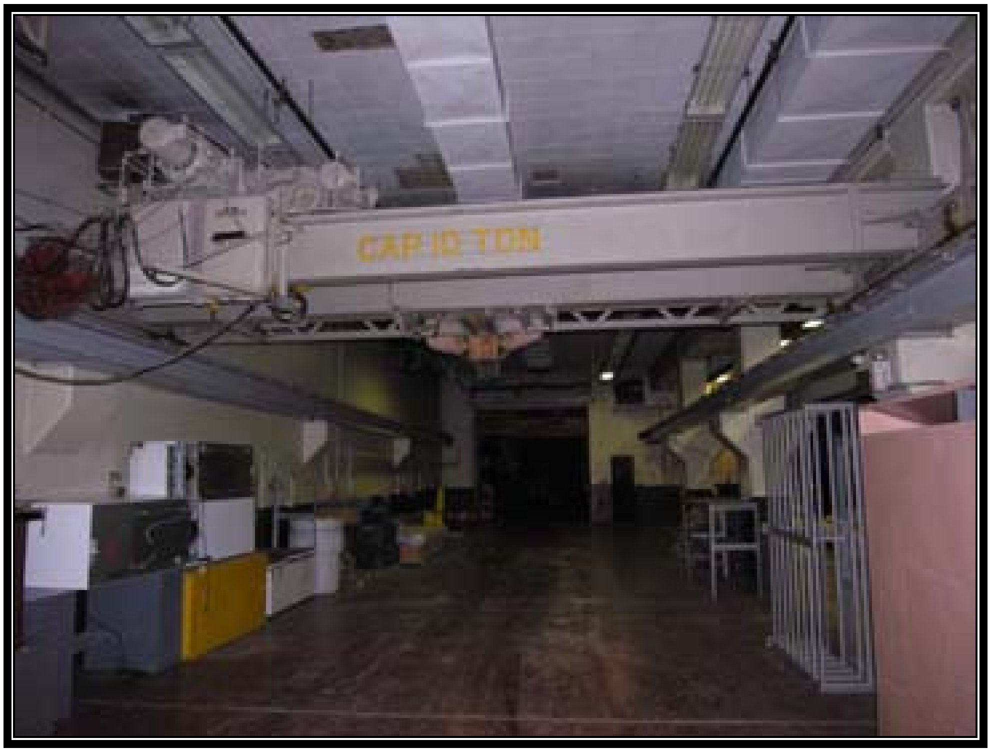

Plate 50 Overhead crane in typical assembly plant, Ellsworth Air Force Base (Photograph by RCG&A, 2008)

Plate 51 Exhaust piping for Tritium venting, Ellsworth Air Force Base (Photograph by RCG&A, 2008)

Plate 52 Plant 4, and “S Structure,” ca. 1995 (Courtesy Kirtland Air Force Base)

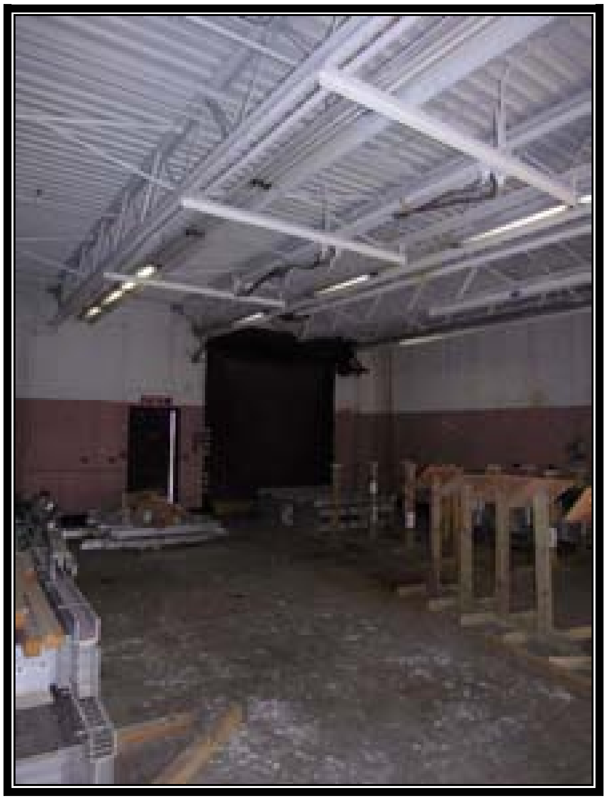

Plate 53 Electrical bay of typical “S Structure,” Ellsworth Air Force Base (Photograph by RCG&A, 2008)

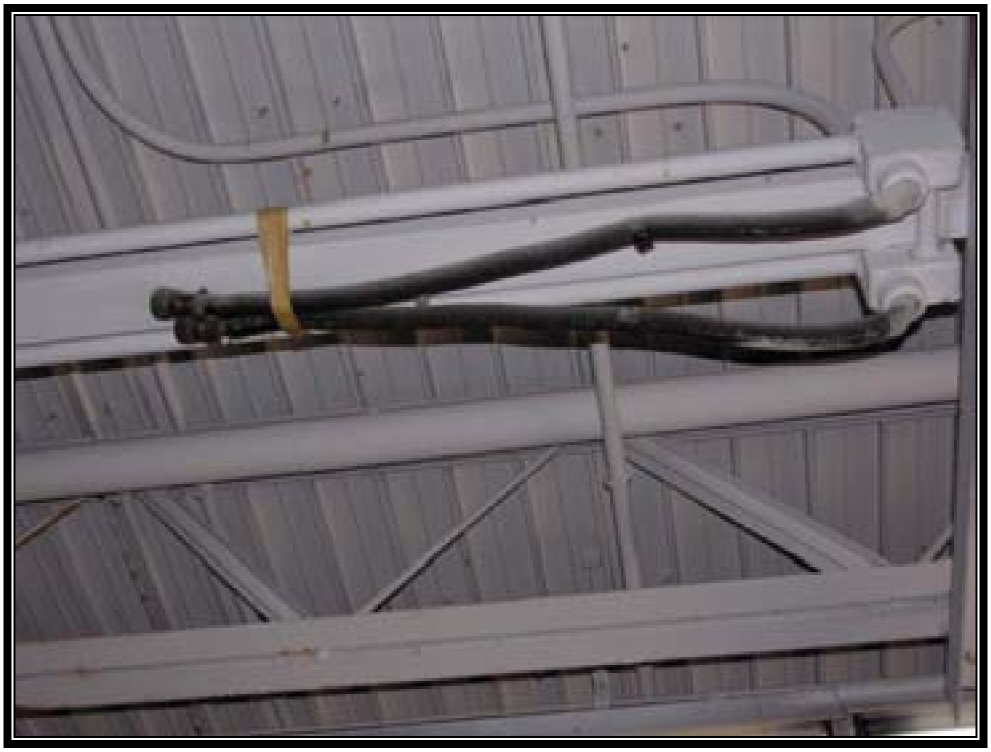

Plate 54 Electrical connectors in “S Structure,” Ellsworth Air Force Base (Photograph by RCG&A, 2008)

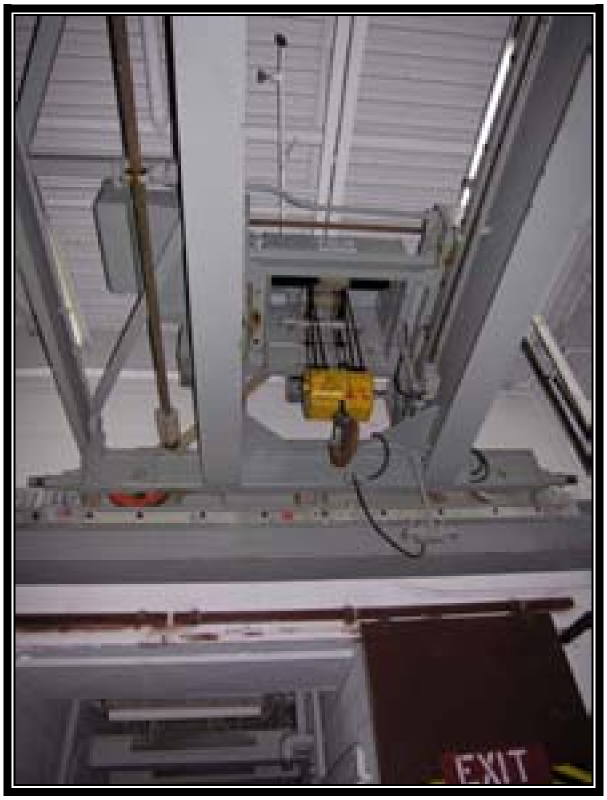

Plate 55 Overhead crane in mechanical bay, Ellsworth Air Force Base (Photograph by RCG&A, 2008)

Plate 56 Grounding strap, Ellsworth Air Force Base (Photograph by RCG&A, 2008)

Plate 57 “Type A (Type VI)” magazine (Photograph by RCG&A, 2008)

Plate 58 “Type A (Type VI)” magazine. Note vent stacks for Tritium gas (Photograph by RCG&A, 2008)

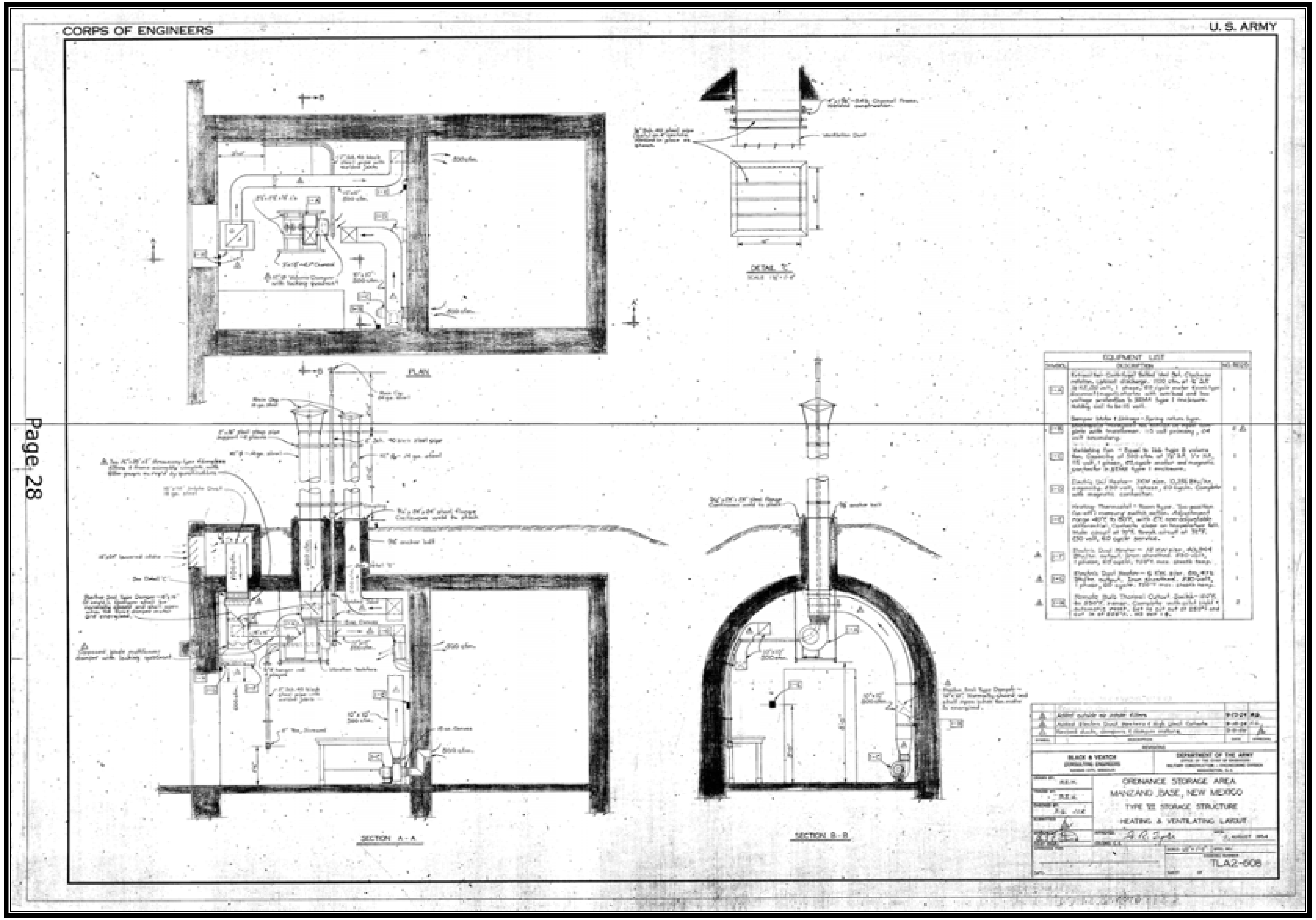

Plate 59 Plans and sections for “Type A (Type VI)” magazine (Courtesy Kirtland Air Force Base)

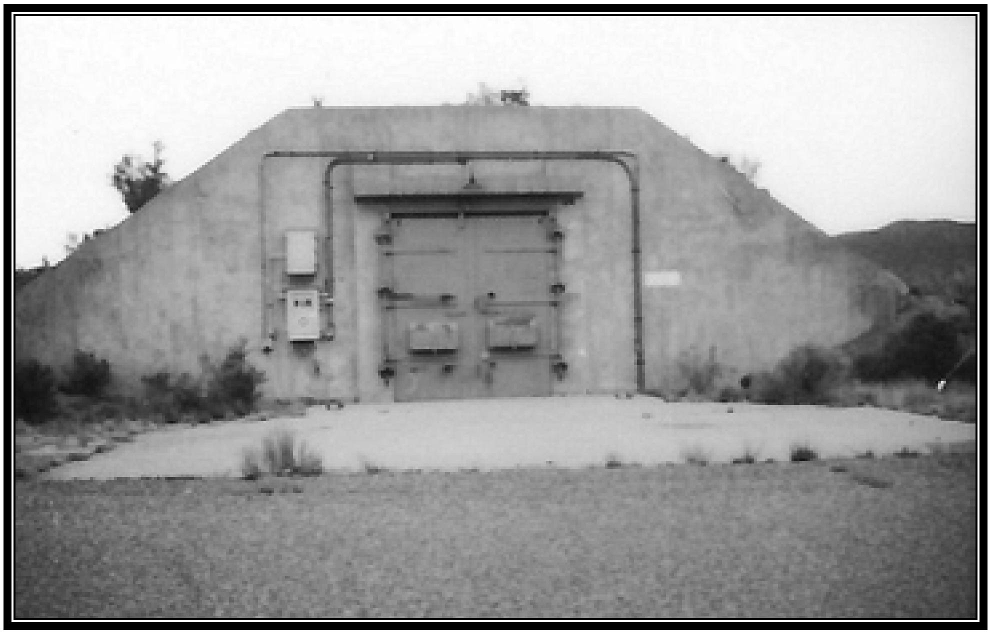

Plate 60 Portal of “Type C” magazine, ca. 1995 (Courtesy Kirtland Air Force Base)

This image removed for security reasons.

Plate 61 Plan of Manzano Base showing locations of all storage magazines and maintenance/assembly plants (Courtesy Kirtland Air Force Base)

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Plate 62 Location of conventional munitions storage area south of runway (Courtesy Kirtland Air Force Base)

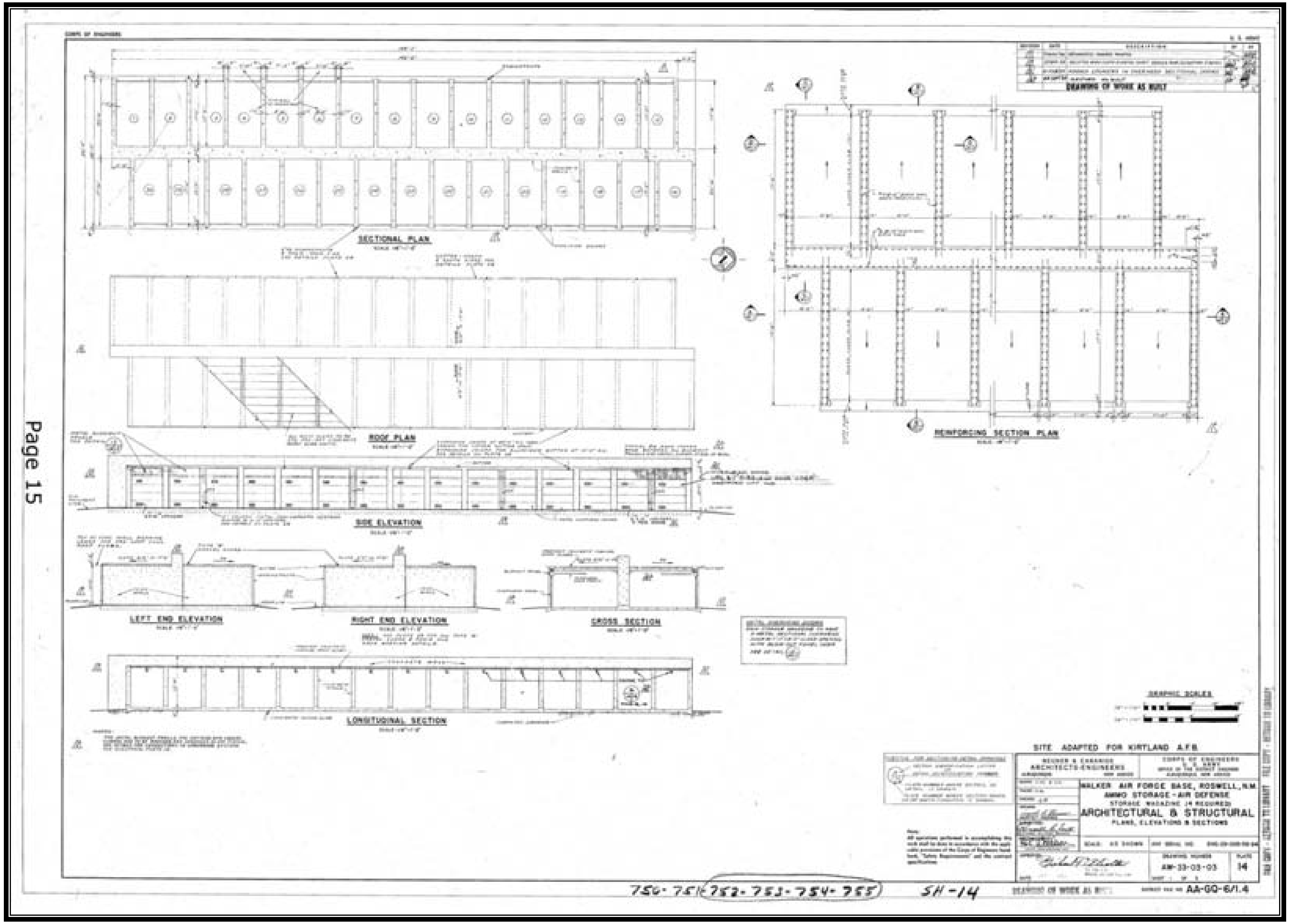


Plate 63 Plans for multi-cube magazines, buildings 752 through 755 (Courtesy Kirtland Air Force Base)

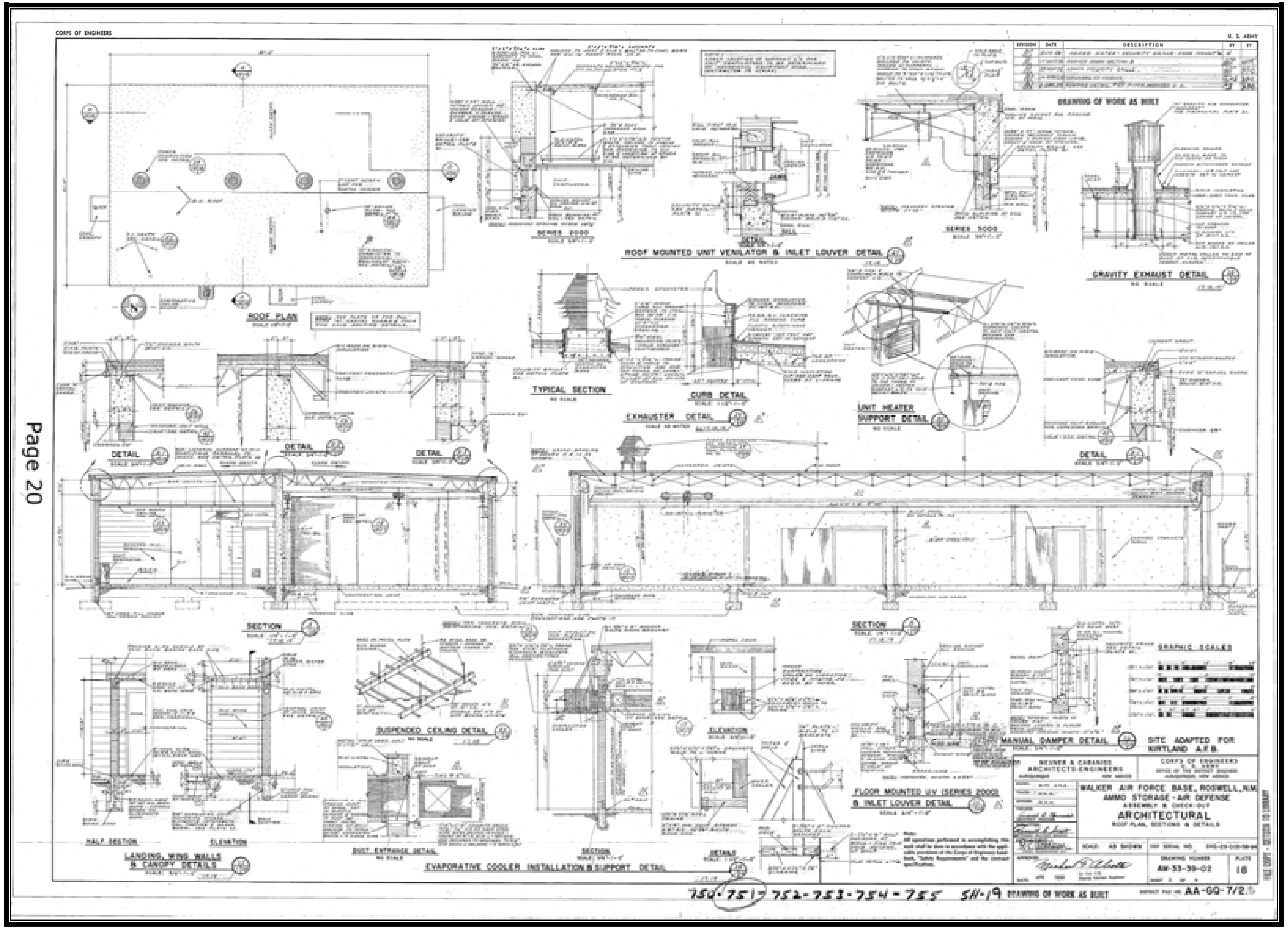


Plate 64 Plans for rocket assembly and checkout building, Building 751 (Courtesy Kirtland Air Force Base)

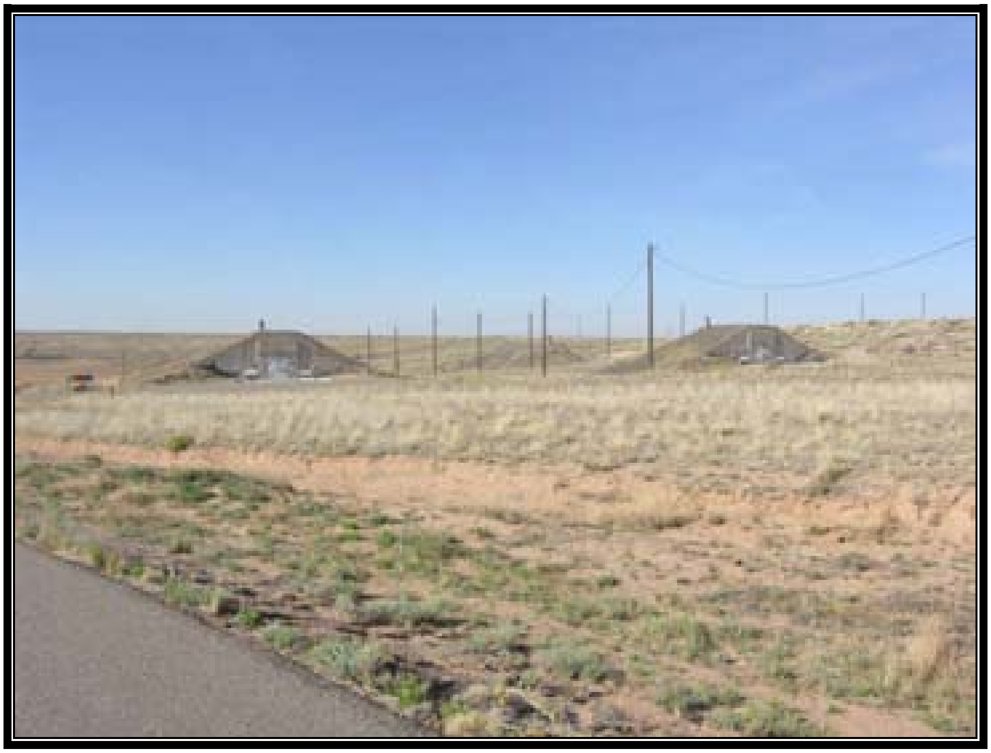


Plate 65 General overview of earth-covered magazines, buildings 744 through 748 (Photograph by RCG&A, 2008)

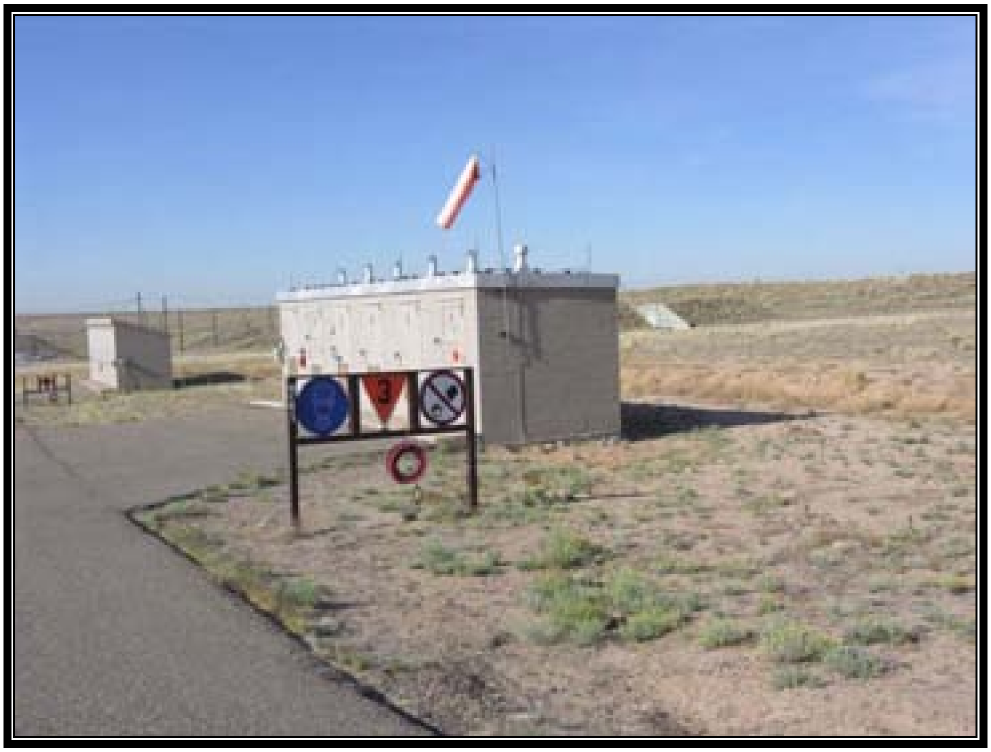


Plate 66 Building 741 (Photograph by RCG&A, 2008)

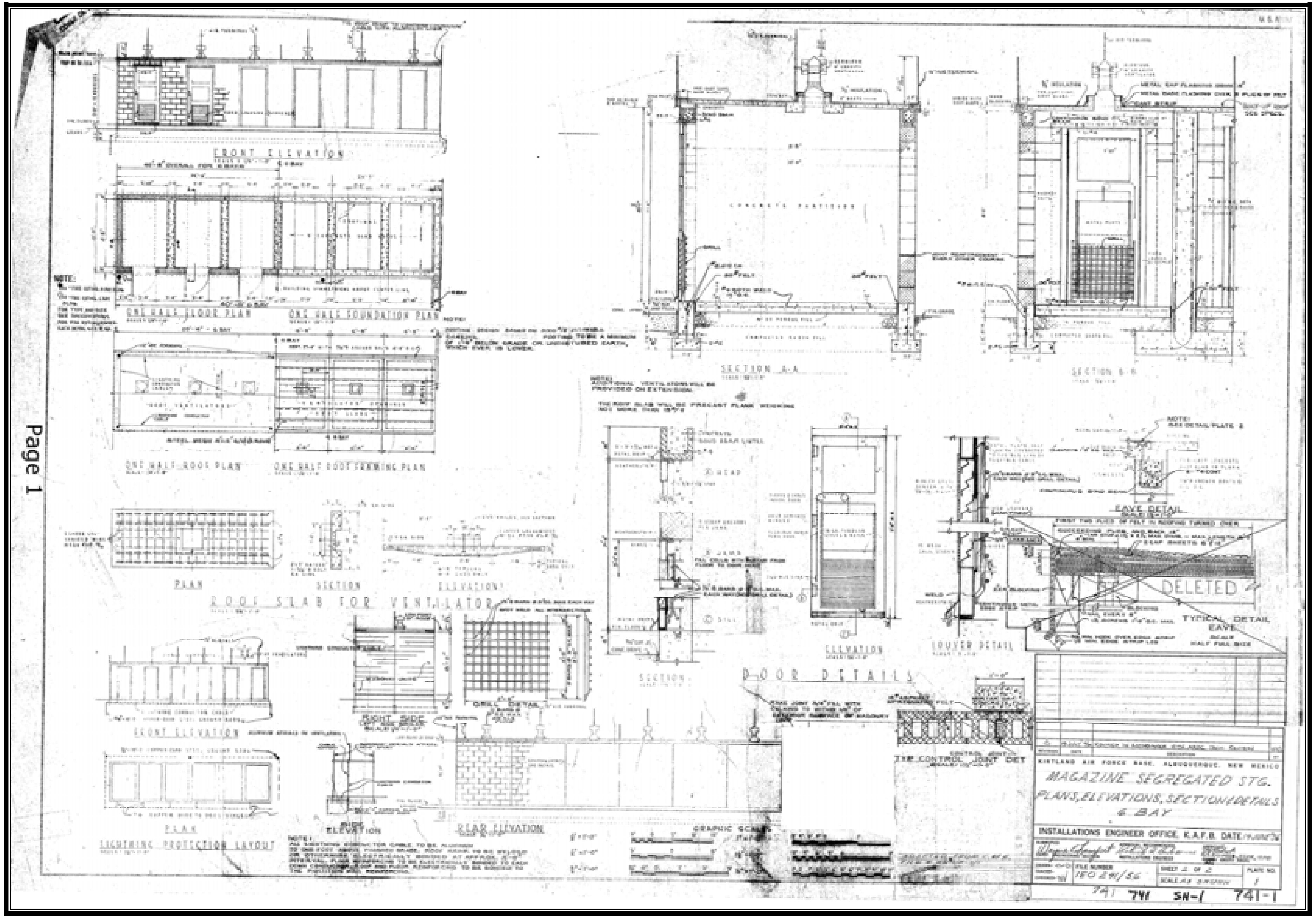


Plate 67 Construction drawings for Building 741 (Courtesy Kirtland Air Force Base)

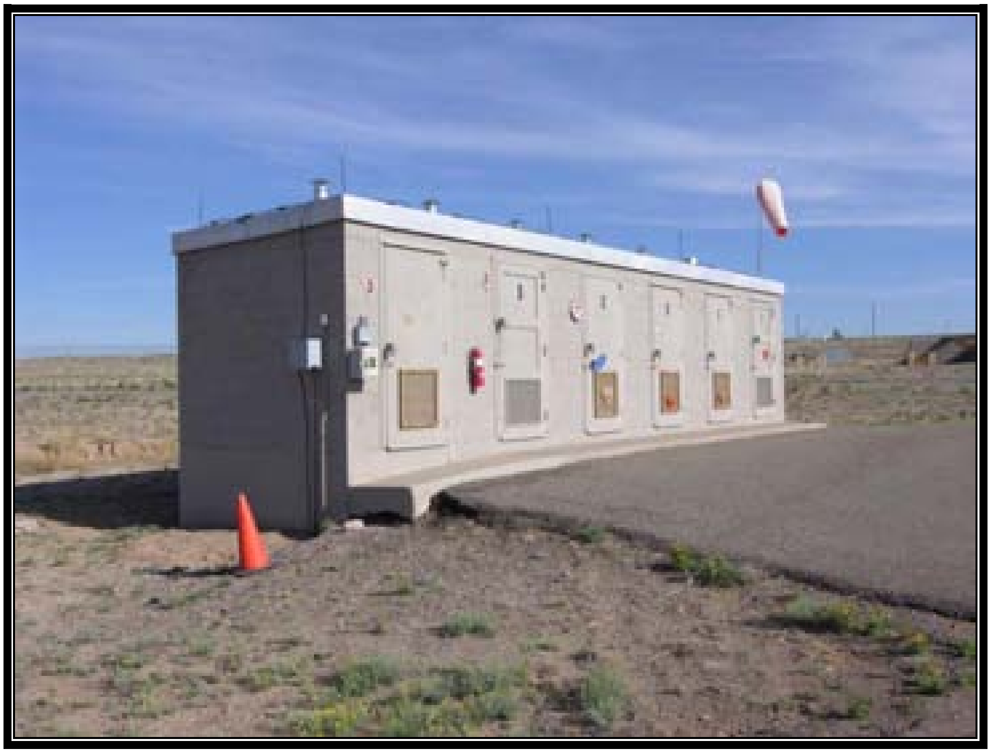


Plate 68 Building 741 (Photograph by RCG&A, 2008)

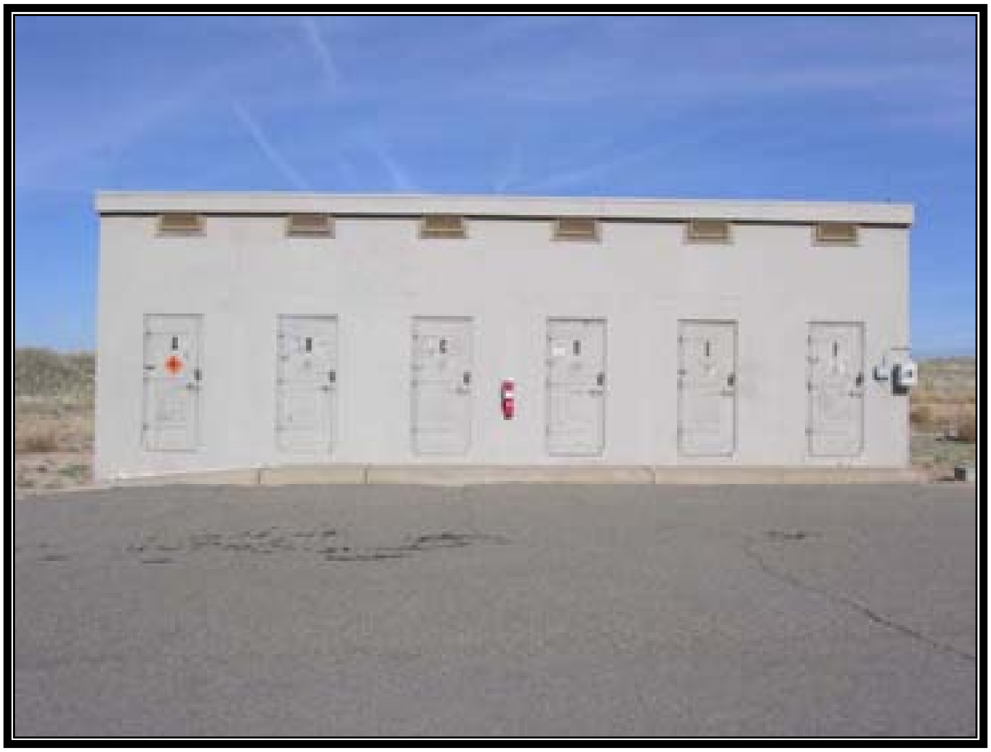


Plate 69 Building 742 (Photograph by RCG&A, 2008)

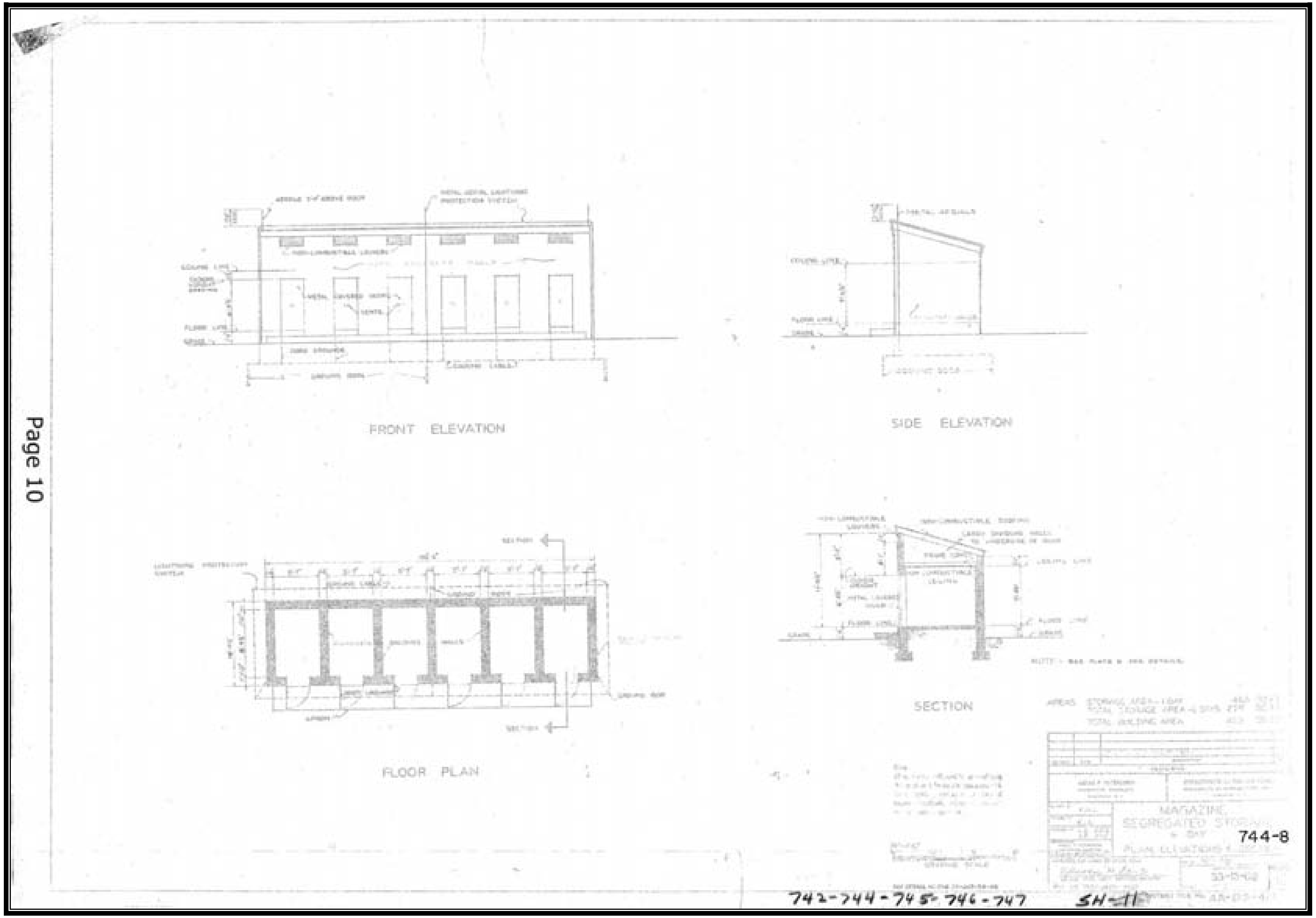


Plate 70 Construction drawings for Building 742 (Courtesy Kirtland Air Force Base)

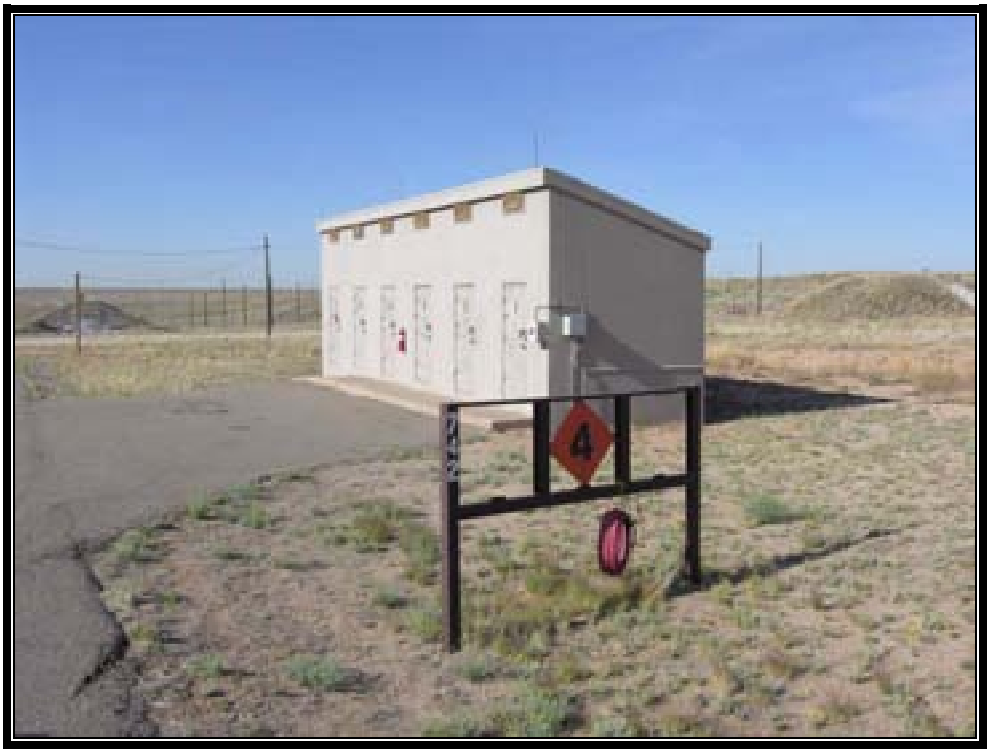


Plate 71 Side view of Building 742 (Photograph by RCG&A, 2008)

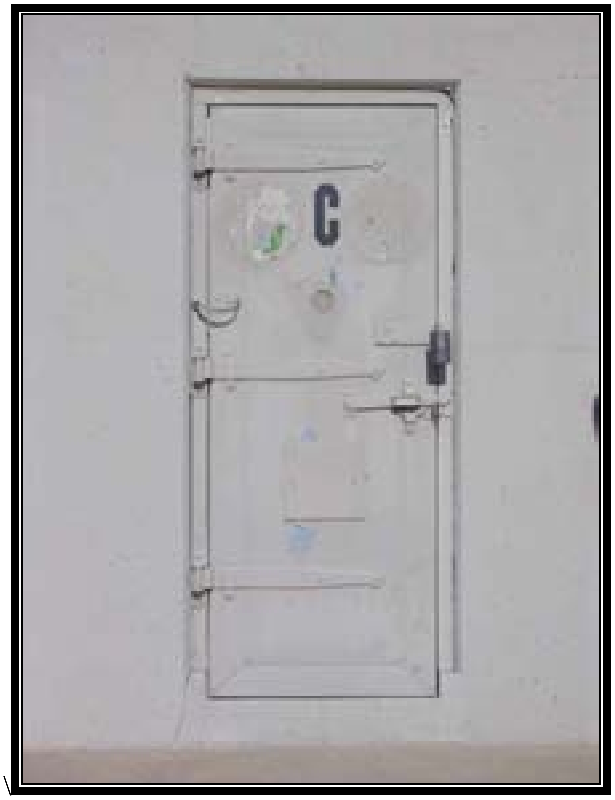


Plate 72 Door of building 742 showing grounding strap (Photograph by RCG&A, 2008)

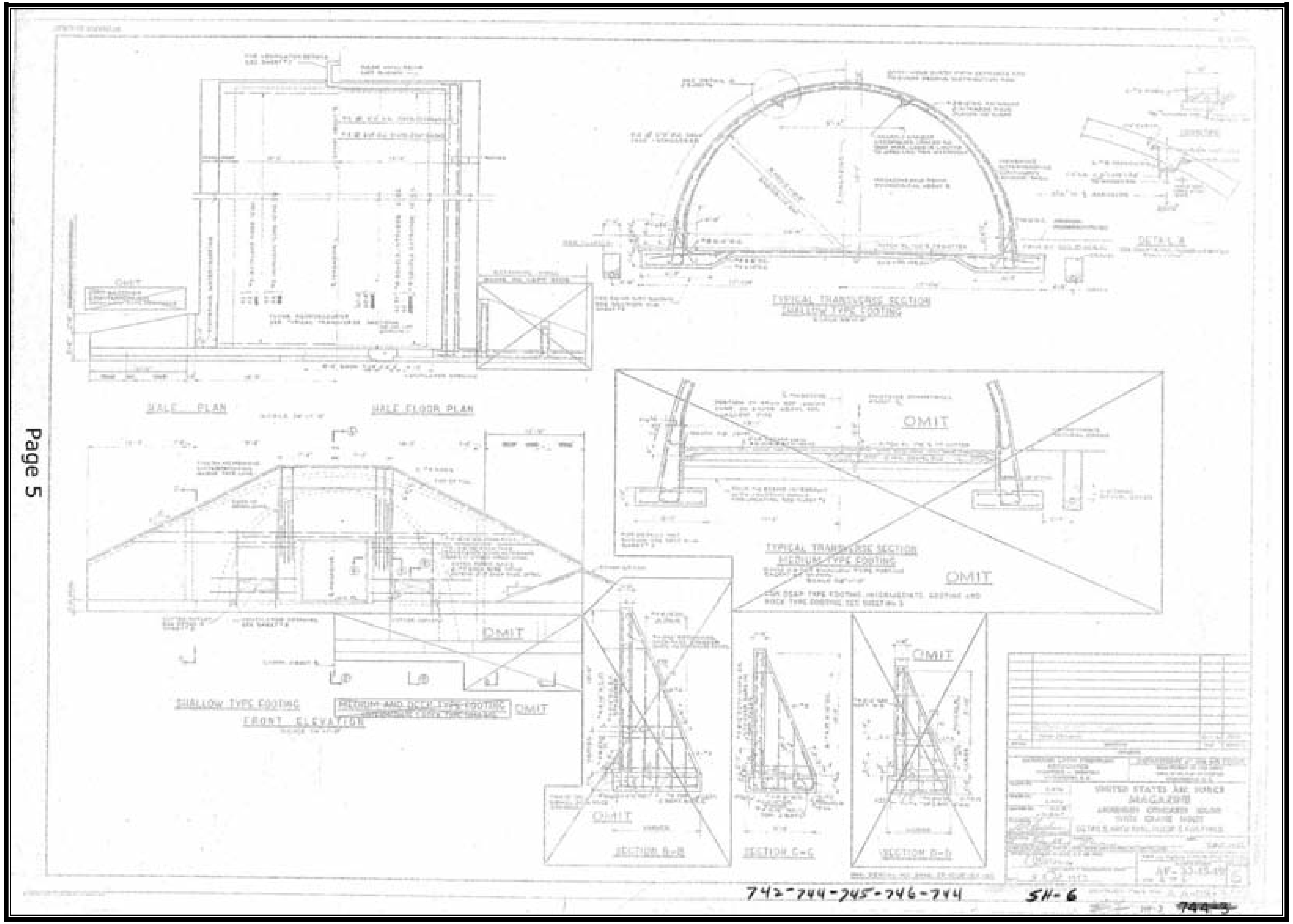


Plate 73 Construction drawings for earth-covered magazines (Courtesy Kirtland Air Force Base)

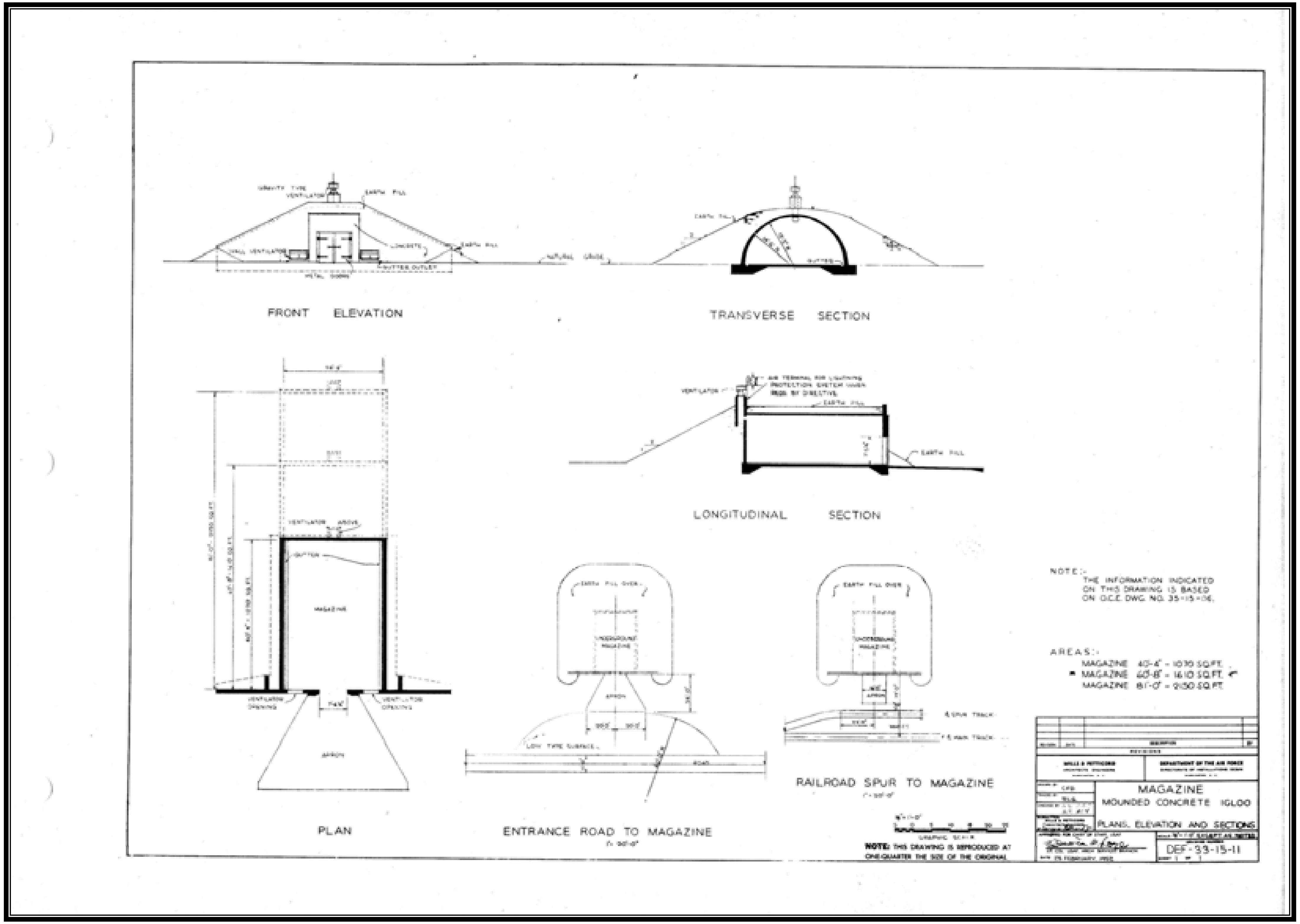

GRAVITY TYPE VENTILATOR
EARTH FILL
CONCRETE
WALL VENTILATOR
GUTTER OUTLET
METAL DOORS
NATURAL GRADE
FRONT ELEVATION
TRANSVERSE SECTION
GUTTER
VENTILATOR
AIR TERMINAL FOR LIGHTNING PROTECTION SYSTEM WHEN REQD. BY DIRECTIVE
EARTH FILL
LONGITUDINAL SECTION
VENTILATOR ABOVE
GUTTER
MAGAZINE
VENTILATOR OPENING
APRON
PLAN
EARTH FILL OVER
UNDERGROUND MAGAZINE
APRON
LOW TYPE SURFACE
ROAD
ENTRANCE ROAD TO MAGAZINE
SPUR TRACK
MAIN TRACK
RAILROAD SPUR TO MAGAZINE
GRAPHIC SCALE
NOTE: THIS DRAWING IS REPRODUCED AT ONE-QUARTER THE SIZE OF THE ORIGINAL
NOTE:-
THE INFORMATION INDICATED ON THIS DRAWING IS BASED ON O.C.E. DWG. NO. 35-15-06.
AREAS:-
MAGAZINE 40'-4" = 1070 SQ.FT.
MAGAZINE 60'-8" = 1610 SQ.FT.
MAGAZINE 81'-0" = 2150 SQ.FT.
REVISIONS
DEPARTMENT OF THE AIR FORCE
MAGAZINE
MOUNDED CONCRETE IGLOO
PLANS, ELEVATION AND SECTIONS
DEF-33-15-11

Plate 74 Air Force standard plan for earth-covered magazines (Courtesy National Museum of the United States Air Force)

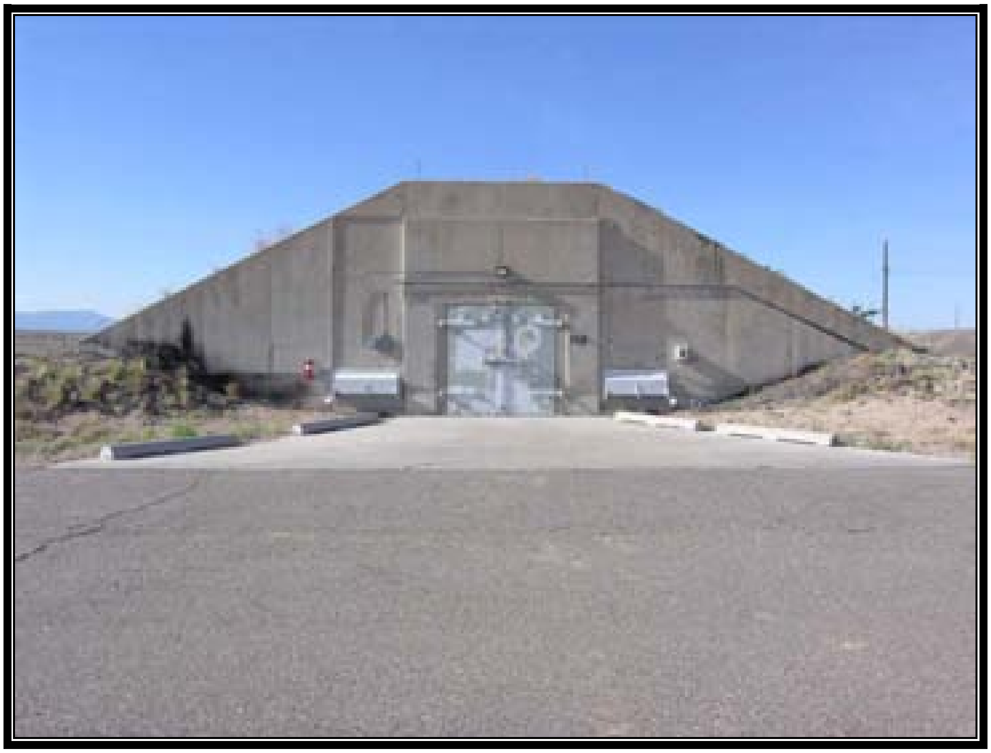


Plate 75 Headwall of Building 745 (Photograph by RCG&A, 2008)

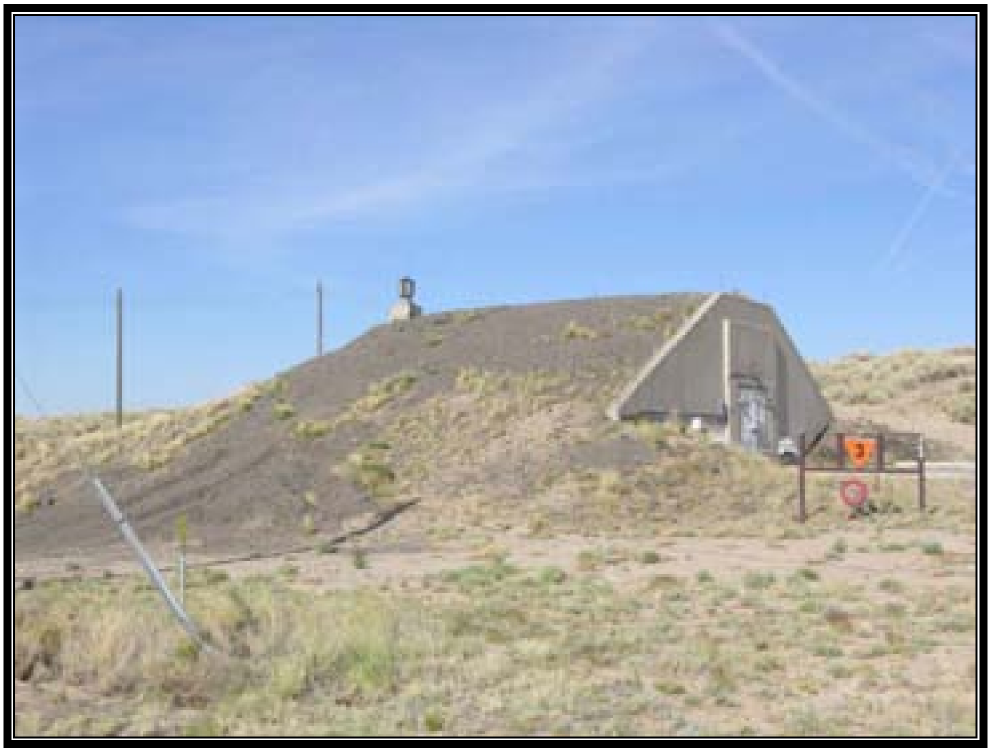


Plate 76 Side view of Building 746 (Photograph by RCG&A, 2008)

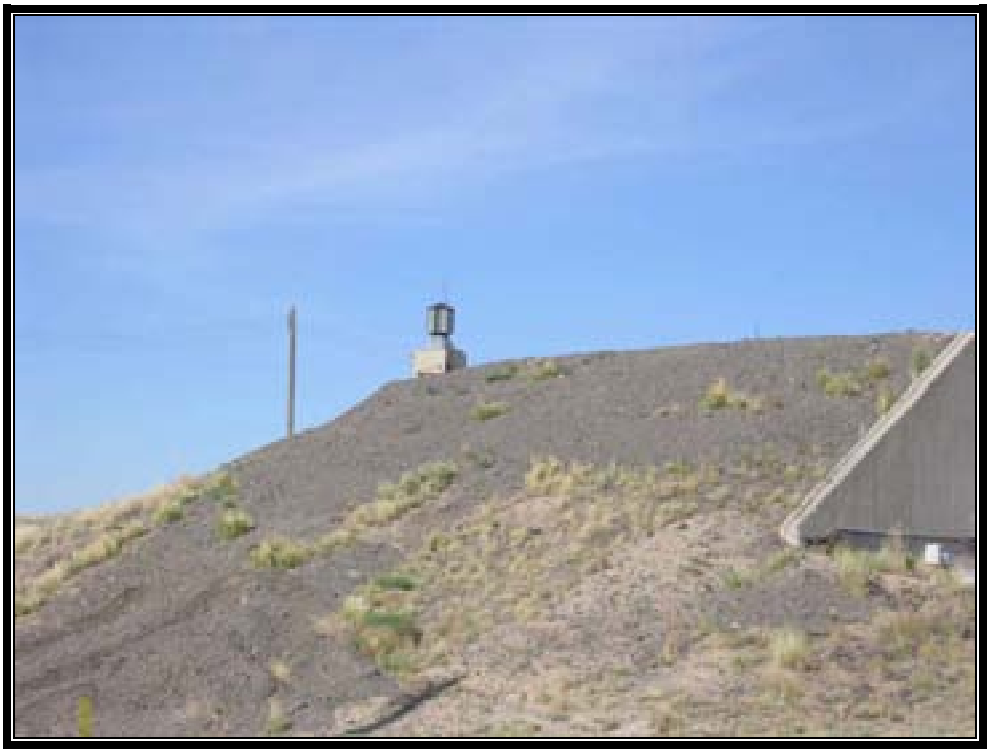


Plate 77 Vent detail of Building 746 (Photograph by RCG&A, 2008)

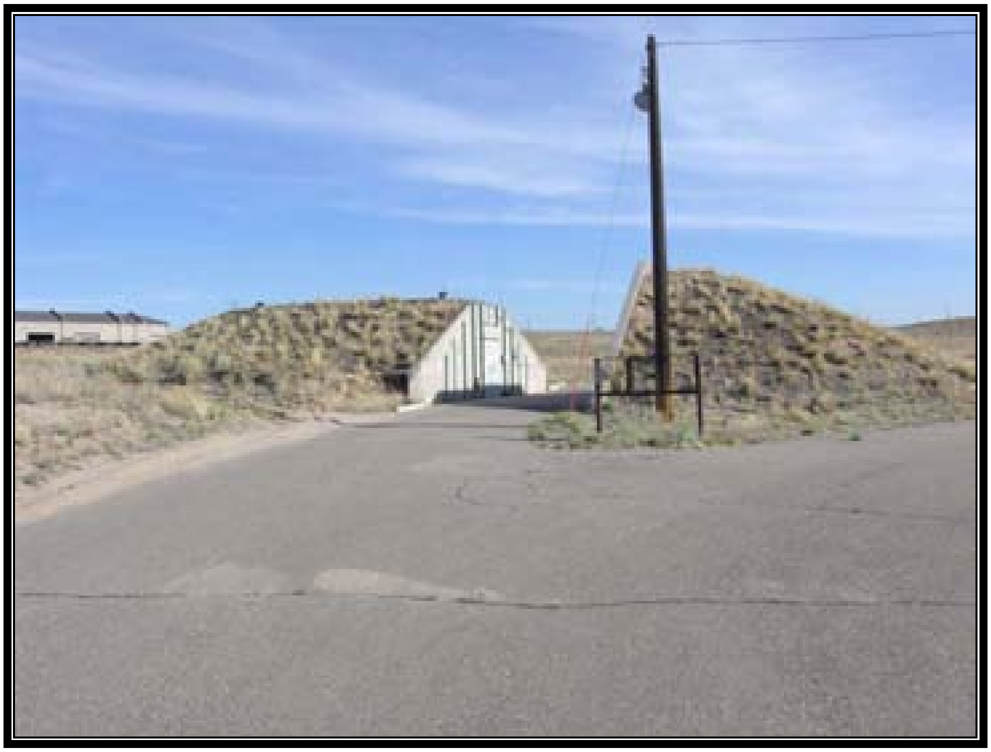


Plate 78 Building 743 (Photograph by RCG&A, 2008)

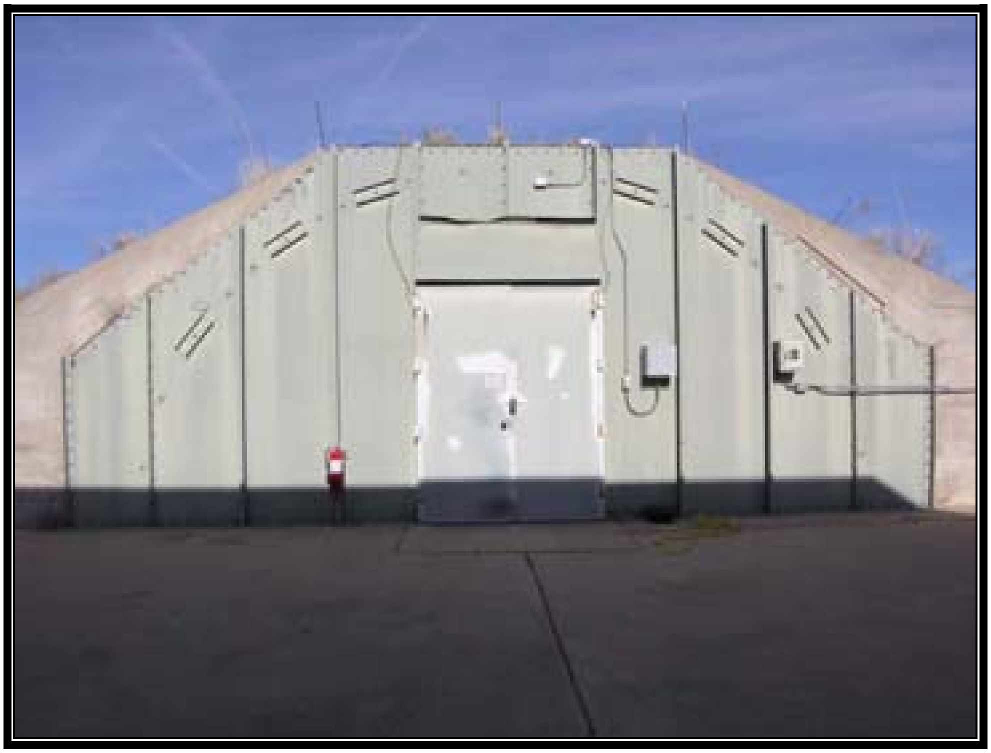


Plate 79 Front wall of Building 743 (Photograph by RCG&A, 2008)

Plate 80 Vent detail of Building 743 (Photograph by RCG&A, 2008)

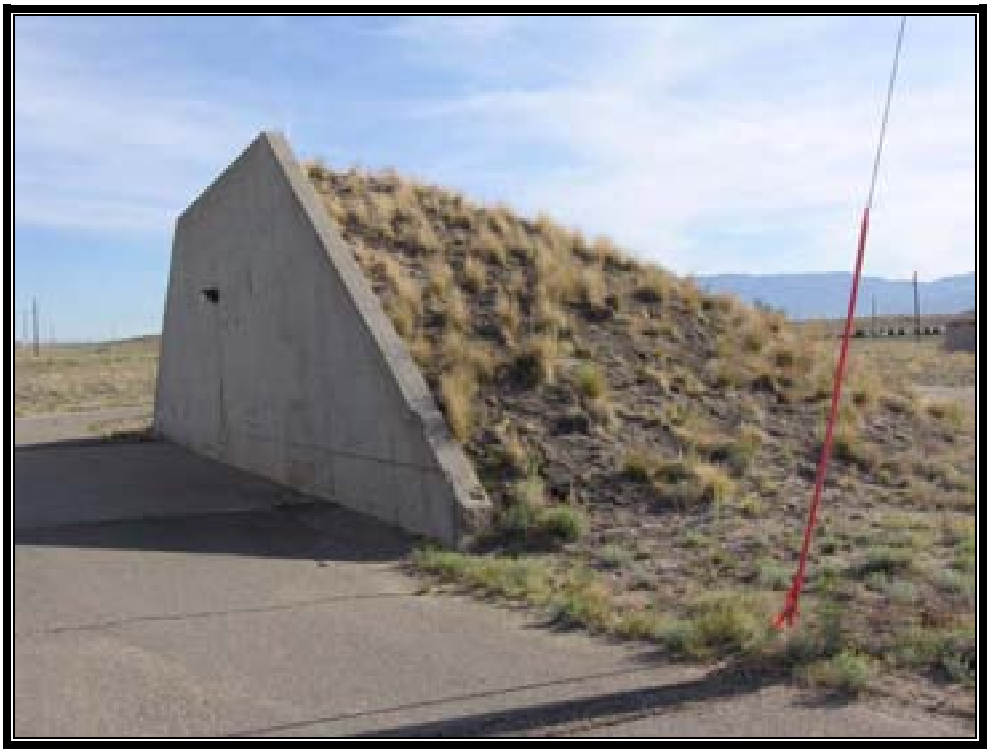


Plate 81 Barricade opposite entry to Building 743 (Photograph by RCG&A, 2008)

Plate 82 Building 28005 (Photograph by RCG&A, 2008)

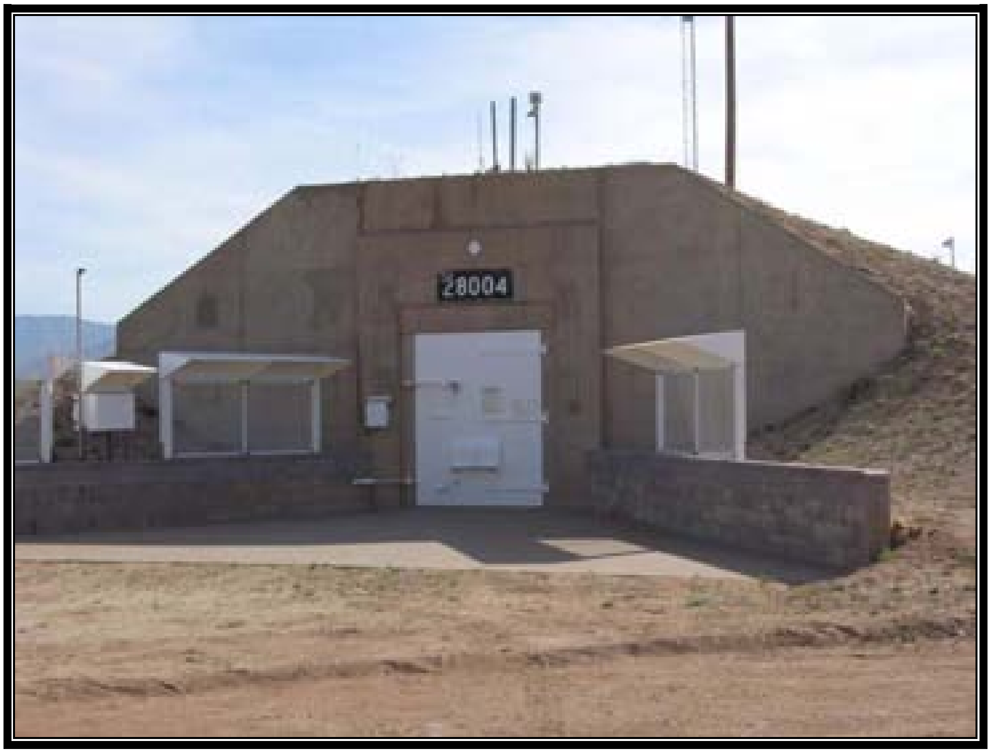


Plate 83 Building 28004 (Photograph by RCG&A, 2008)

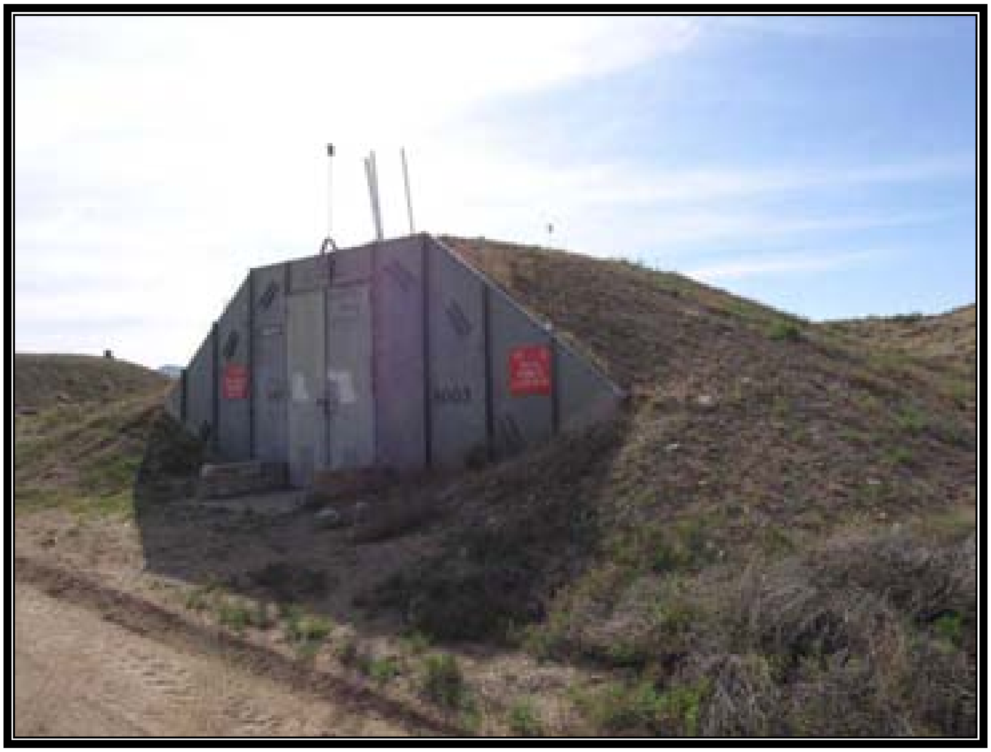


Plate 84 Building 28003 (Photograph by RCG&A, 2008)

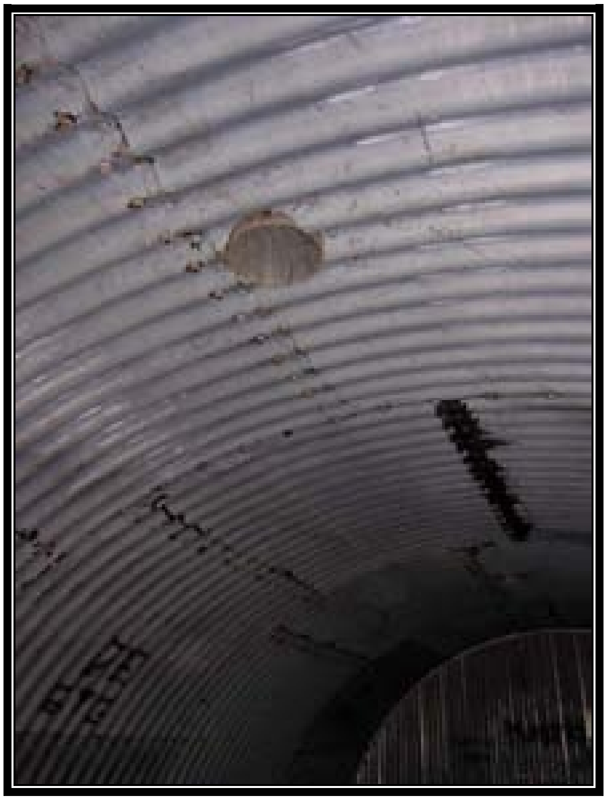


Plate 85 Roof and vent detail, Building 28003 (Photograph by RCG&A, 2008)

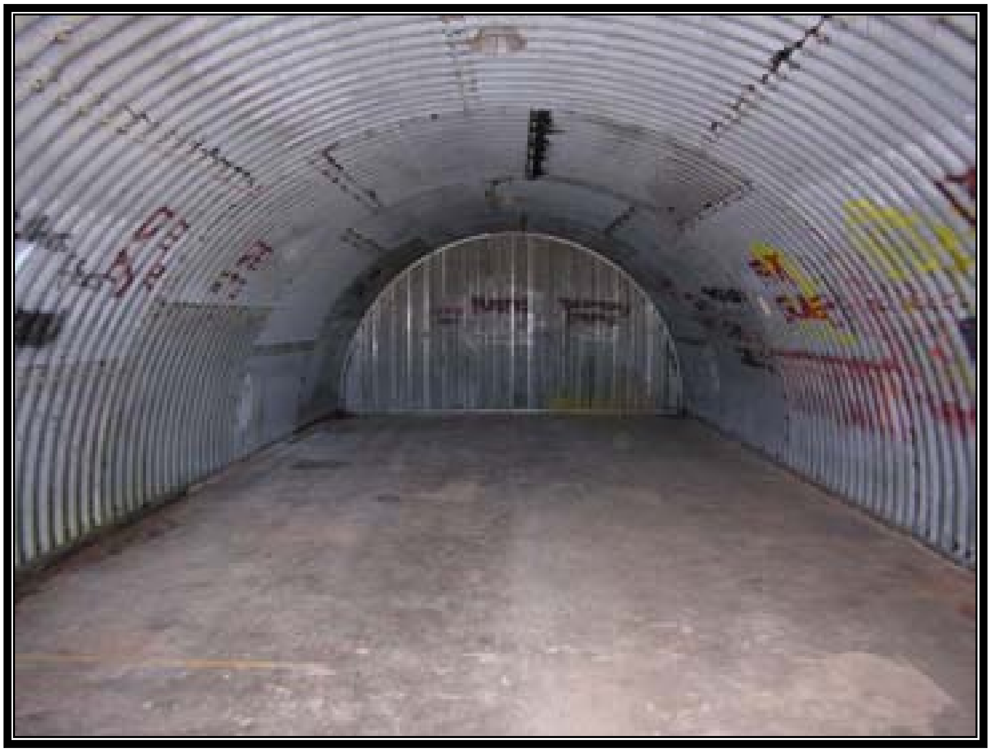


Plate 86 Interior, Building 28003 (Photograph by RCG&A, 2008)

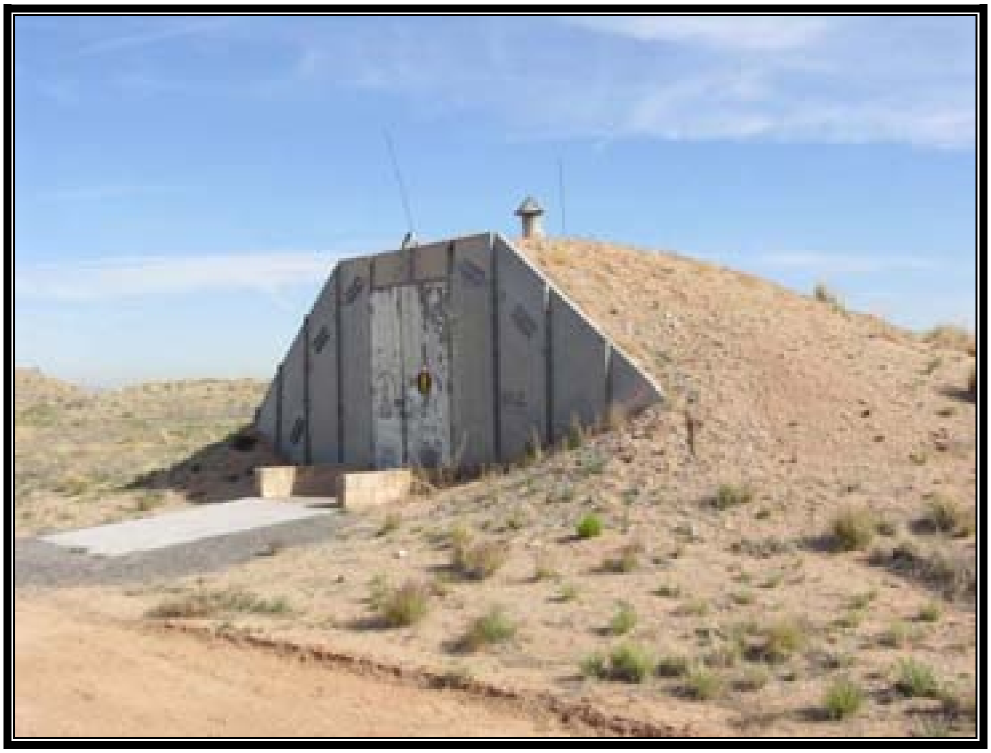


Plate 87 Building 28012 (Photograph by RCG&A, 2008)

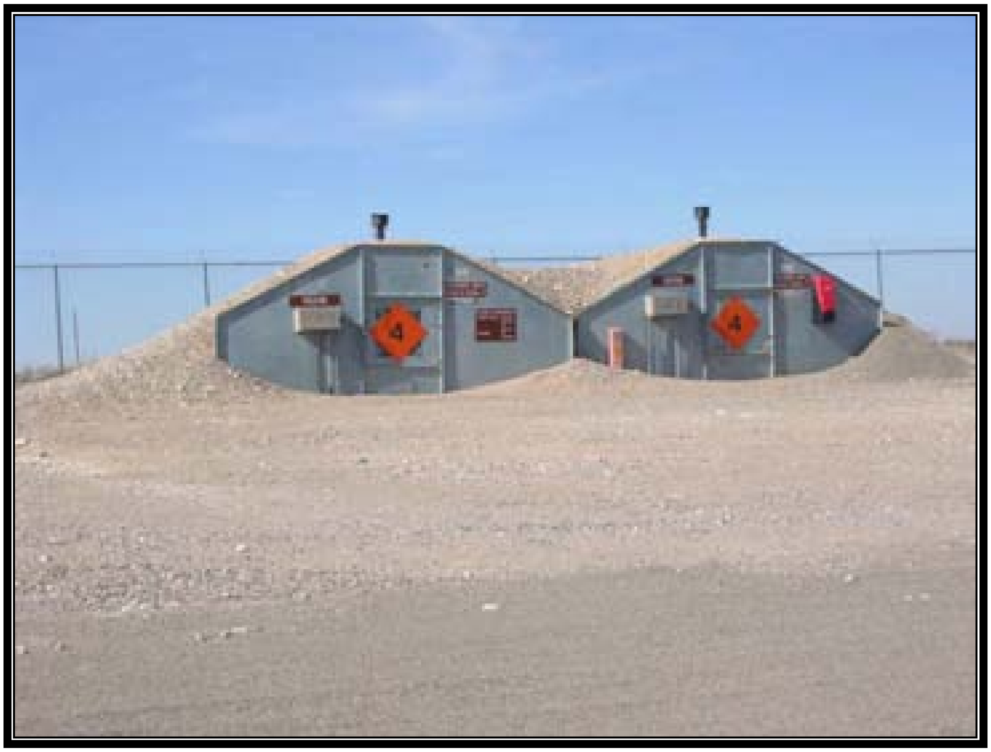


Plate 88 Building 29024 (Photograph by RCG&A, 2008)

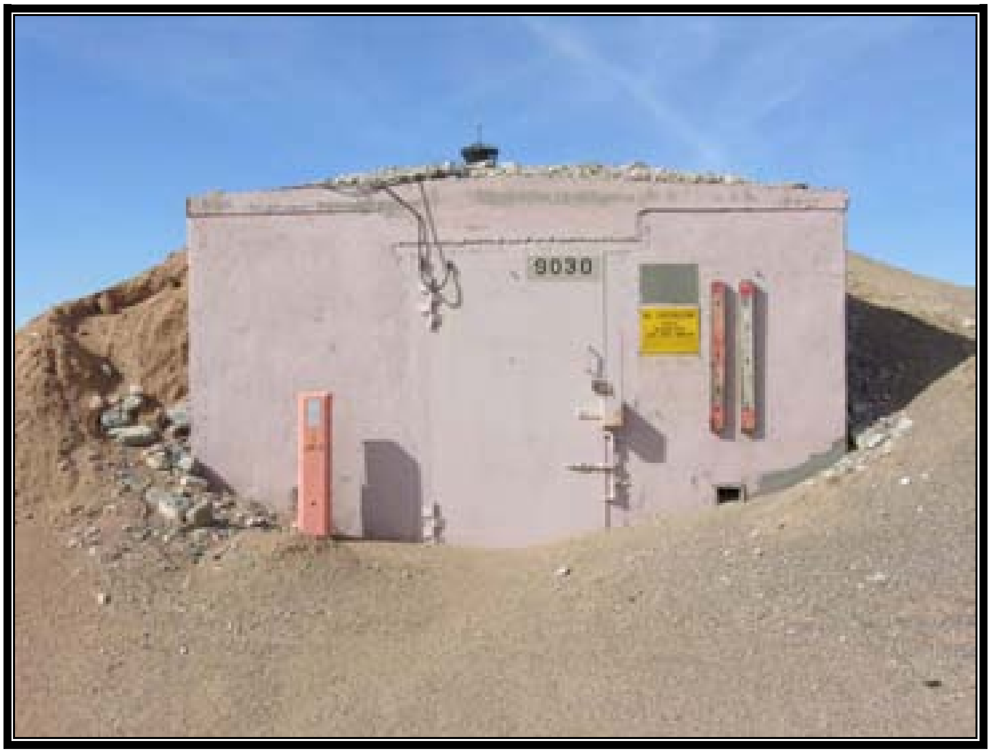


Plate 89 Building 29030 (Photograph by RCG&A, 2008)

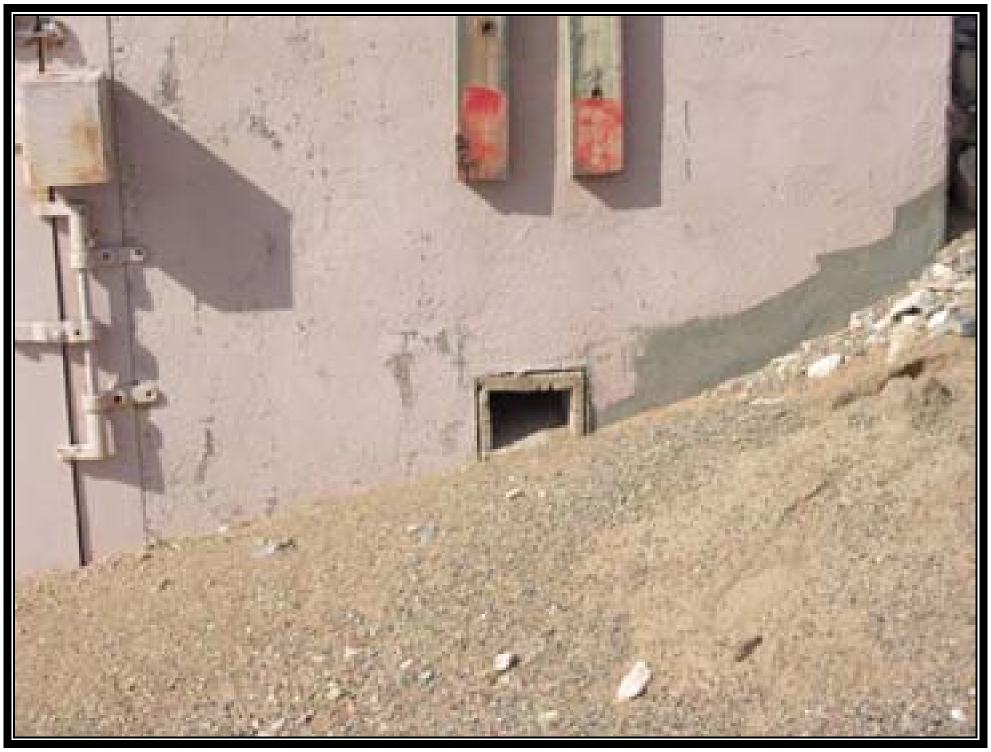


Plate 90 Lower vent detail, Building 29030 (Photograph by RCG&A, 2008)

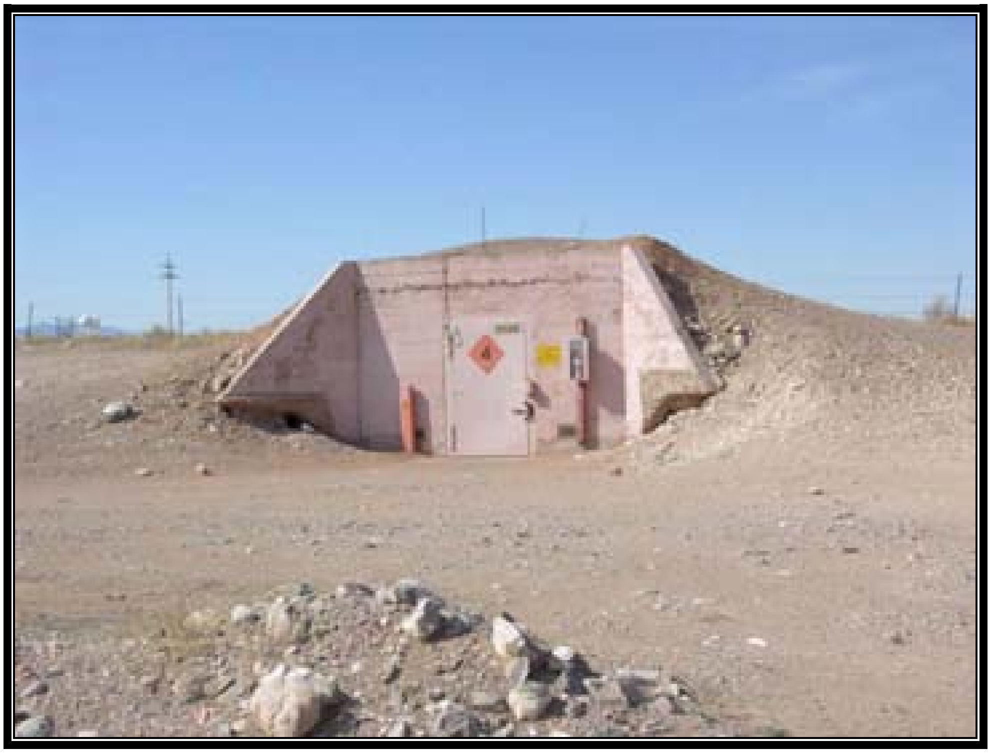


Plate 91 Building 29028 (Photograph by RCG&A, 2008)

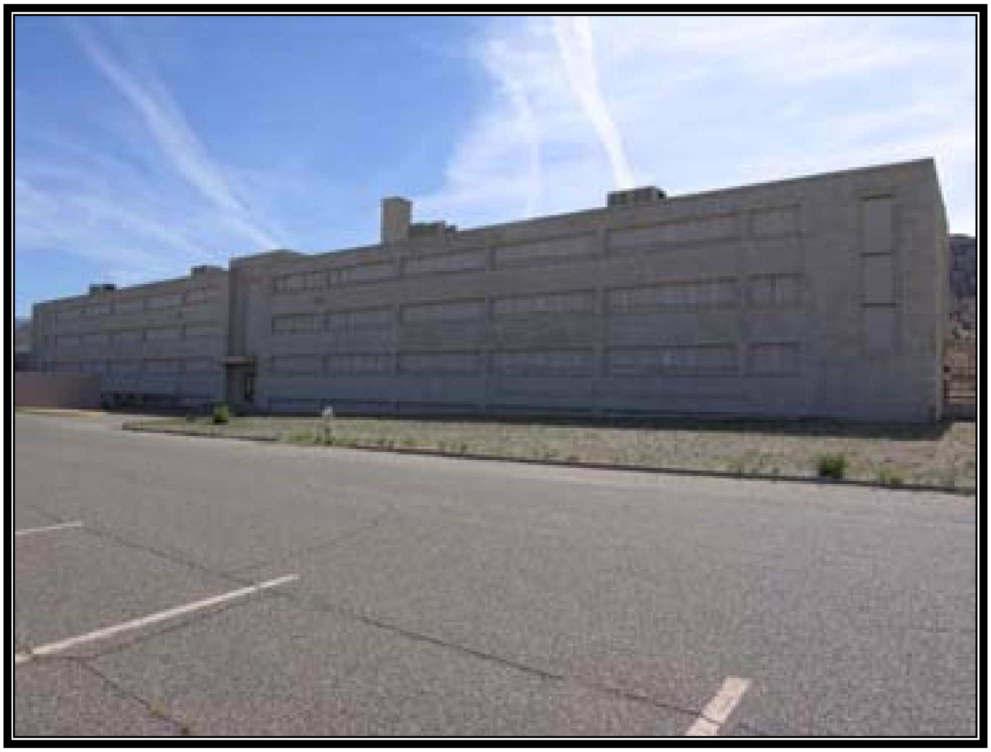


Plate 92 Building 30143, west elevation (Photograph by RCG&A, 2008)

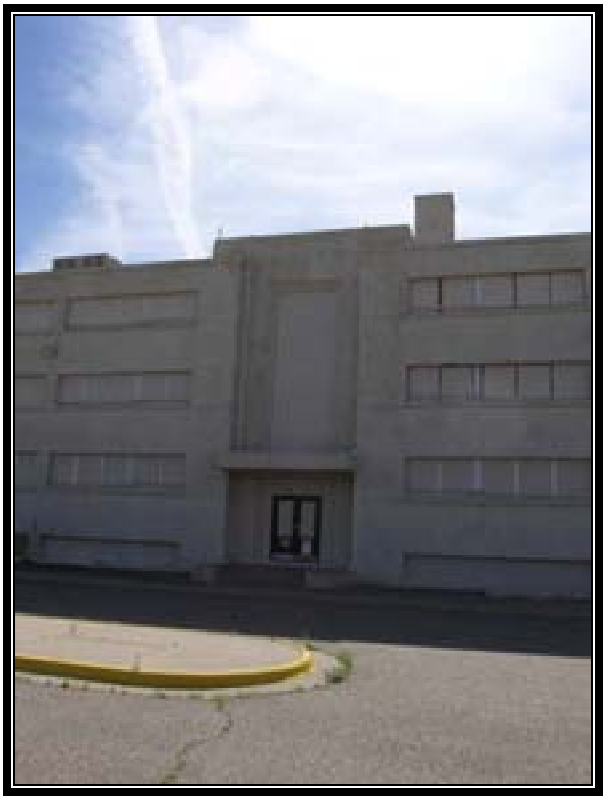


Plate 93 Building 30143, entry detail (Photograph by RCG&A, 2008)

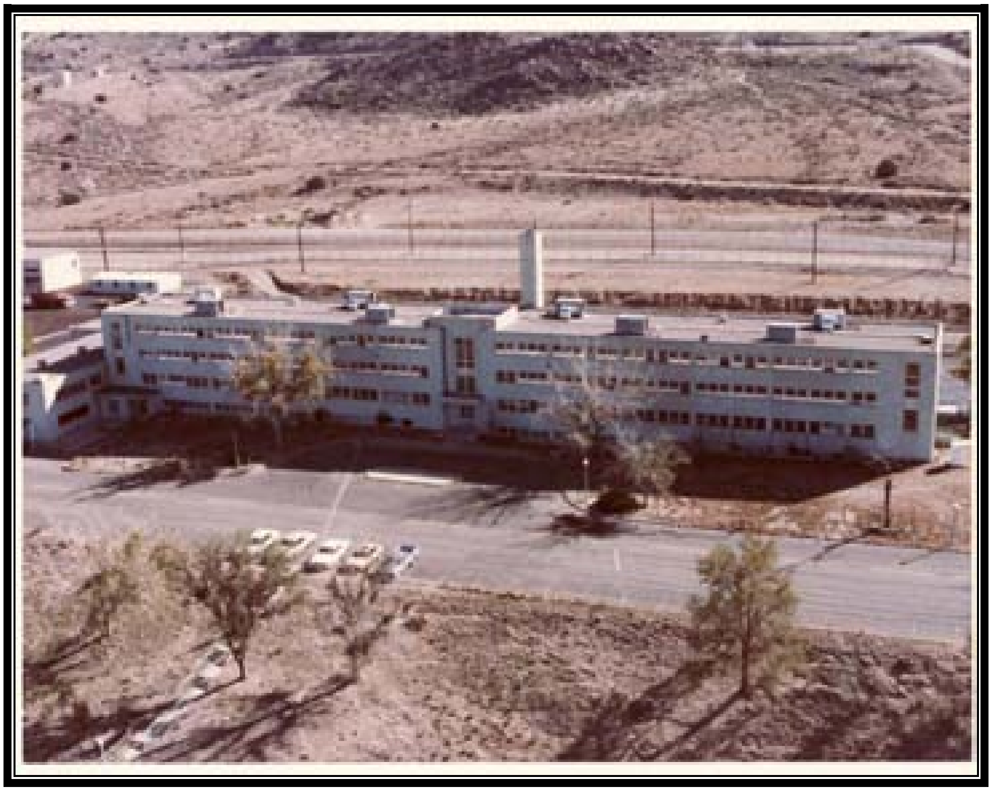


Plate 94 Building 30143, ca. 1960 (Courtesy Kirtland Air Force Base)

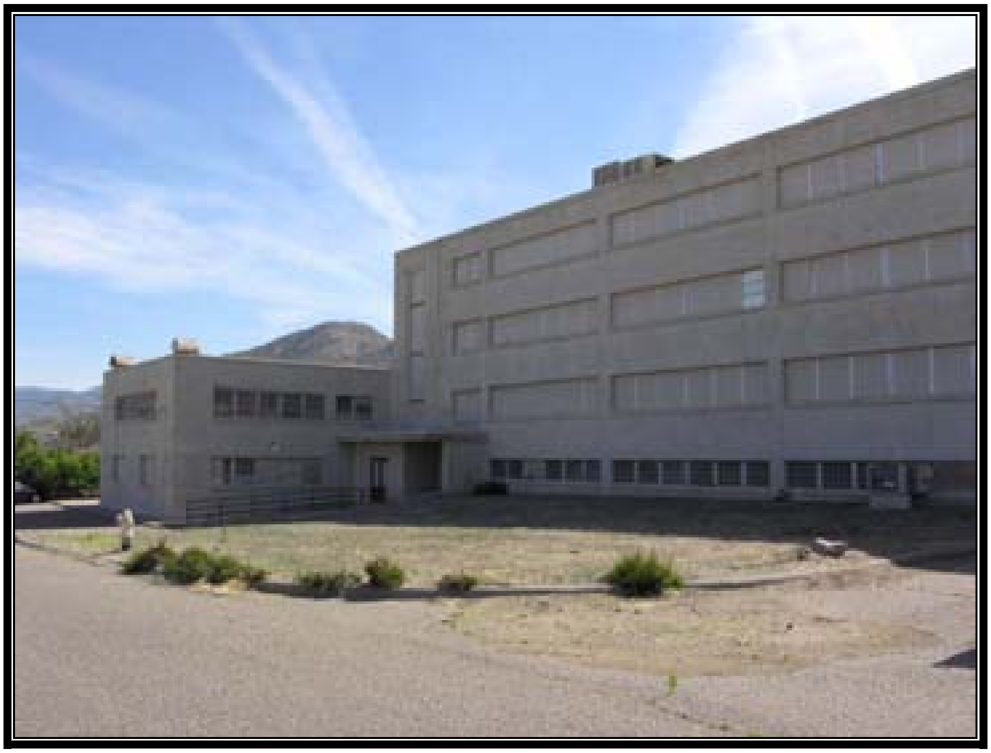


Plate 95 Building 30143, view looking northeast towards dining hall (Photograph by RCG&A, 2008)

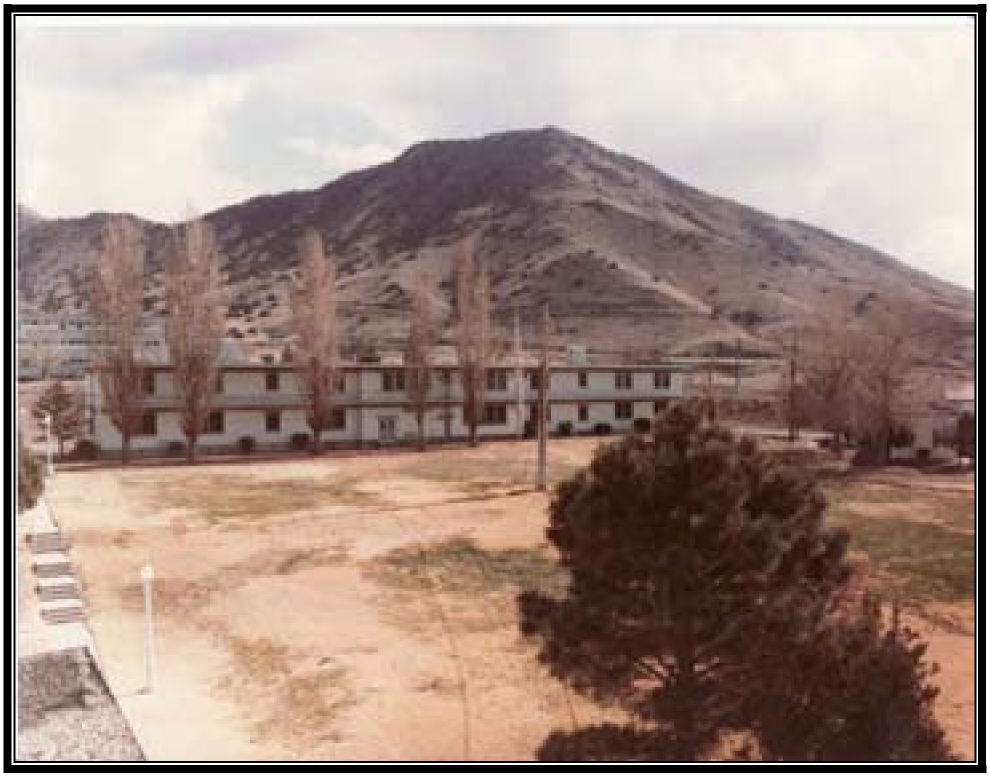


Plate 96 Building 30132, ca. 1960 (Courtesy Kirtland Air Force Base)

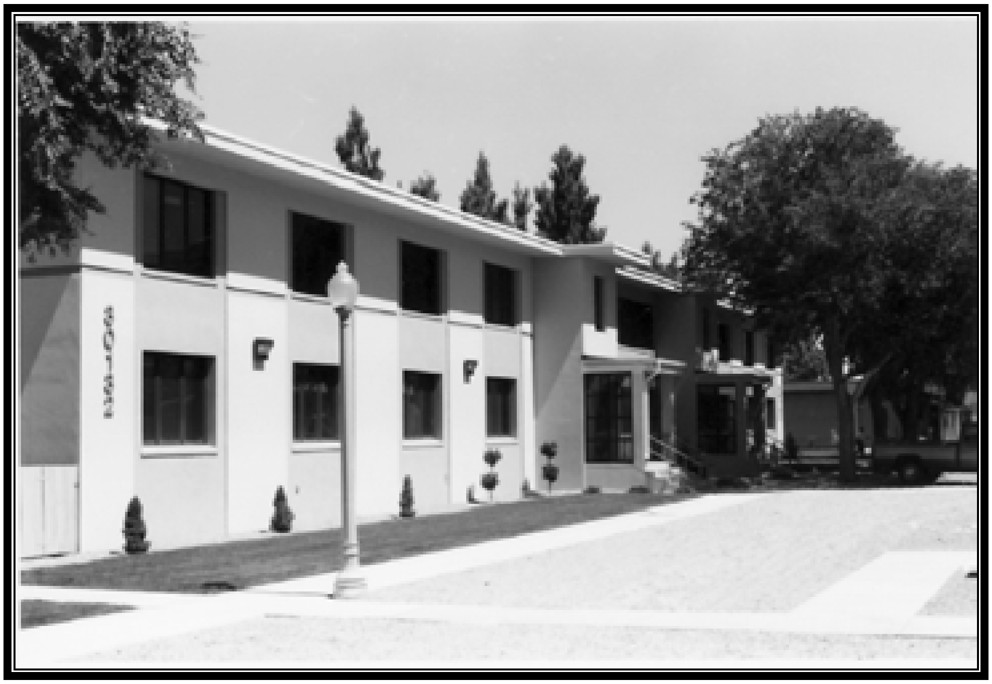


Plate 97 Building 30132, ca.1995 (Courtesy Kirtland Air Force Base)

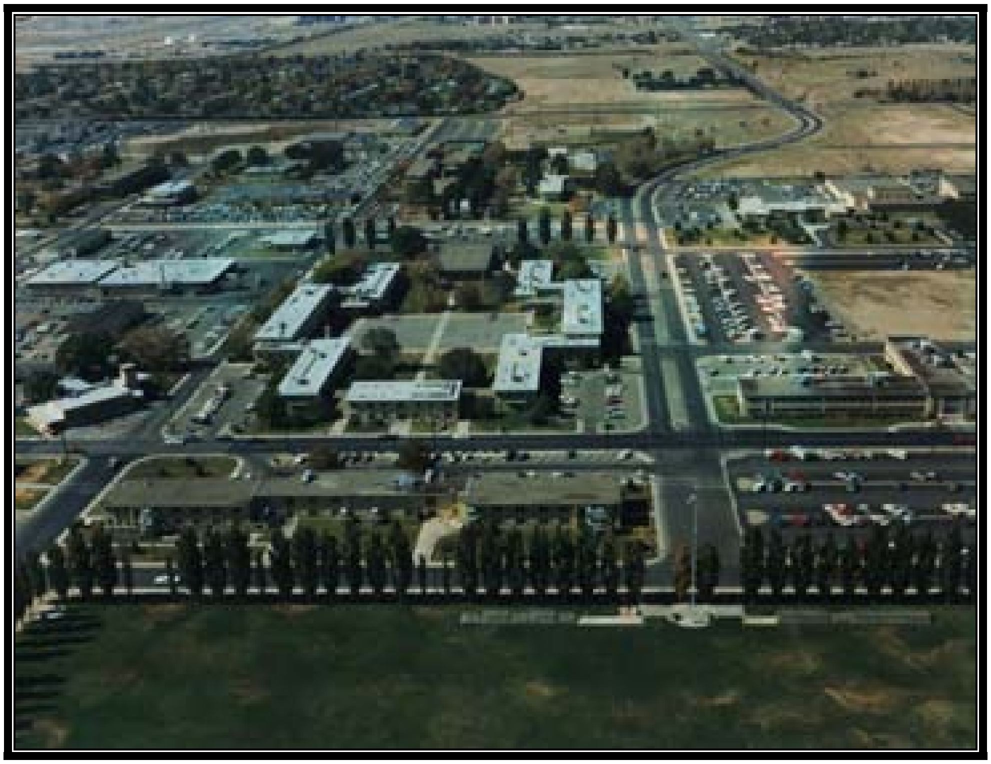


Plate 98 Aerial view of dormitories, ca. 1977. Buildings 20202 and 20203 in foreground, 20221 and 20222 to rear (Courtesy Kirtland Air Force Base)

Plate 99 Interior courtyard between buildings 20221 and 20222 (Photograph by RCG&A, 2008)

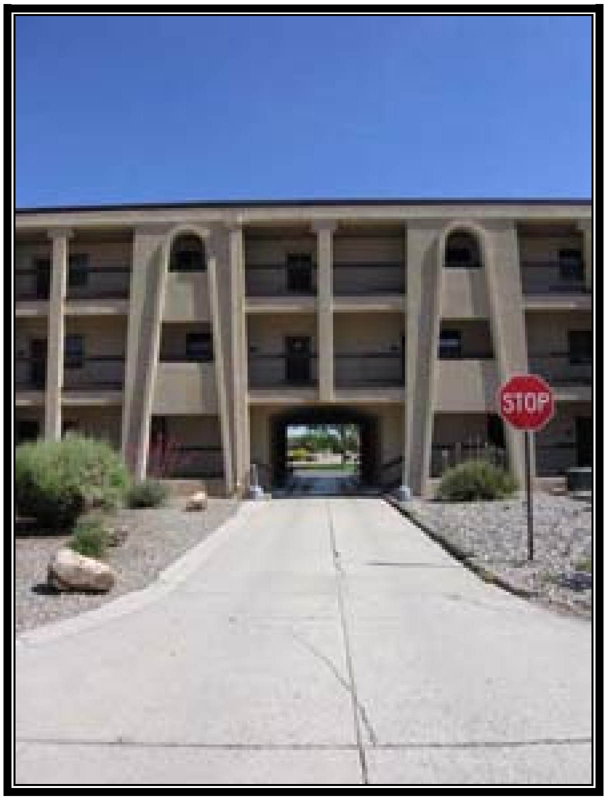


Plate 100 Vehicle drive-thru, Building 20221 (Photograph by RCG&A, 2008)

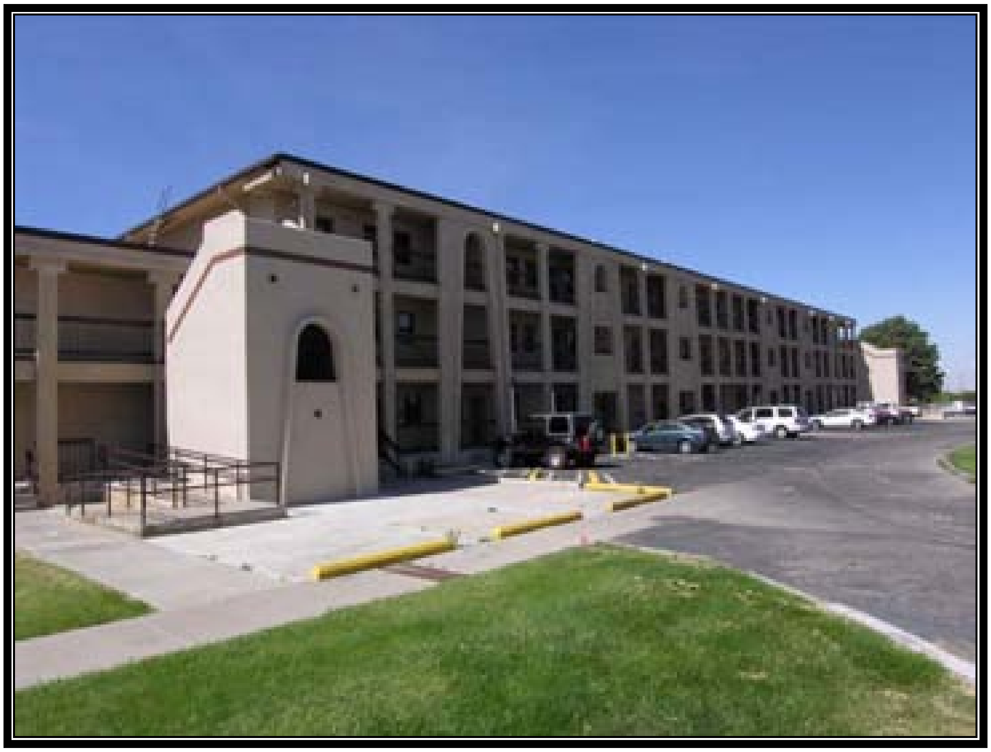


Plate 101 Three-story section of dormitory (Photograph by RCG&A, 2008)

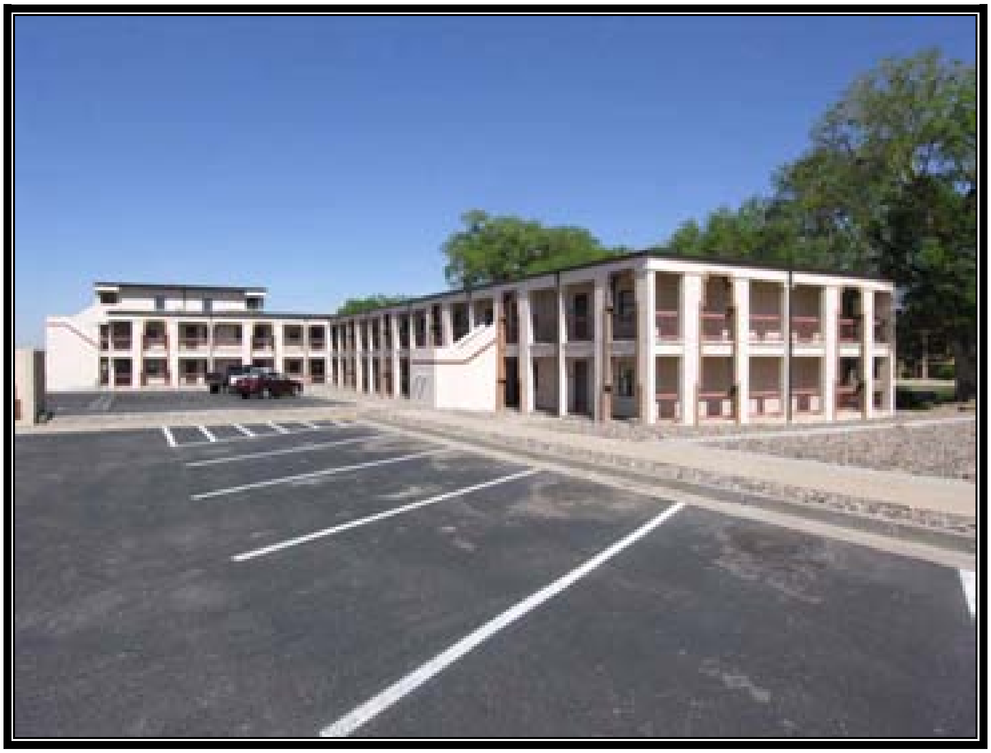


Plate 102 Two-story section of building (Photograph by RCG&A, 2008)

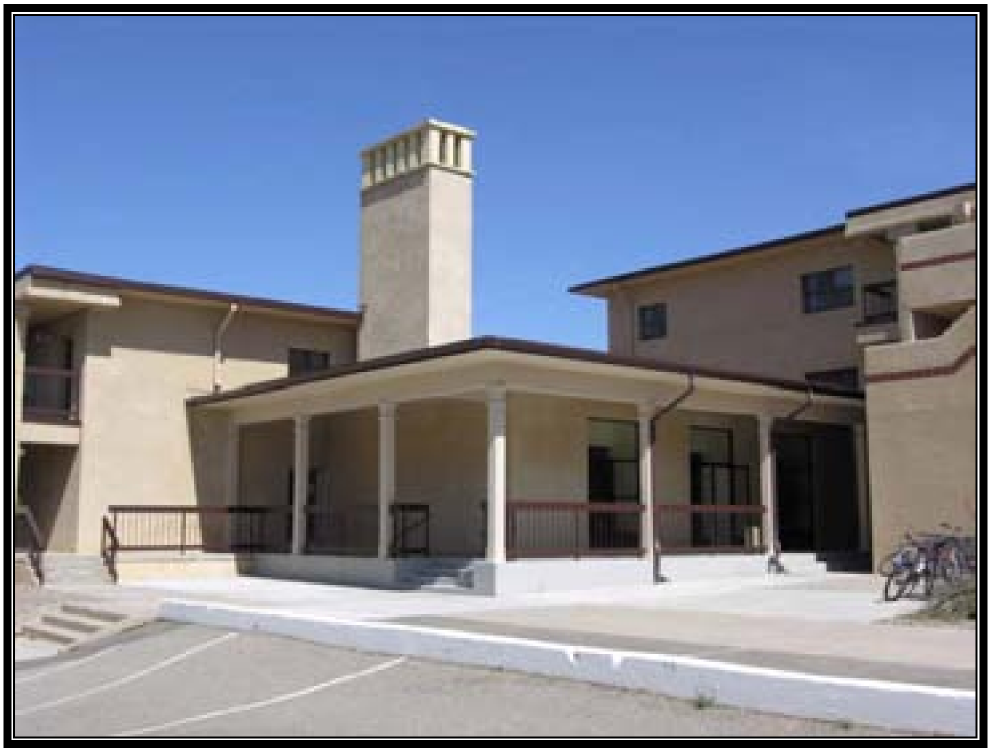


Plate 103 First story lounge (Photograph by RCG&A, 2008)

Plate 104 Interior of lounge (Photograph by RCG&A, 2008)

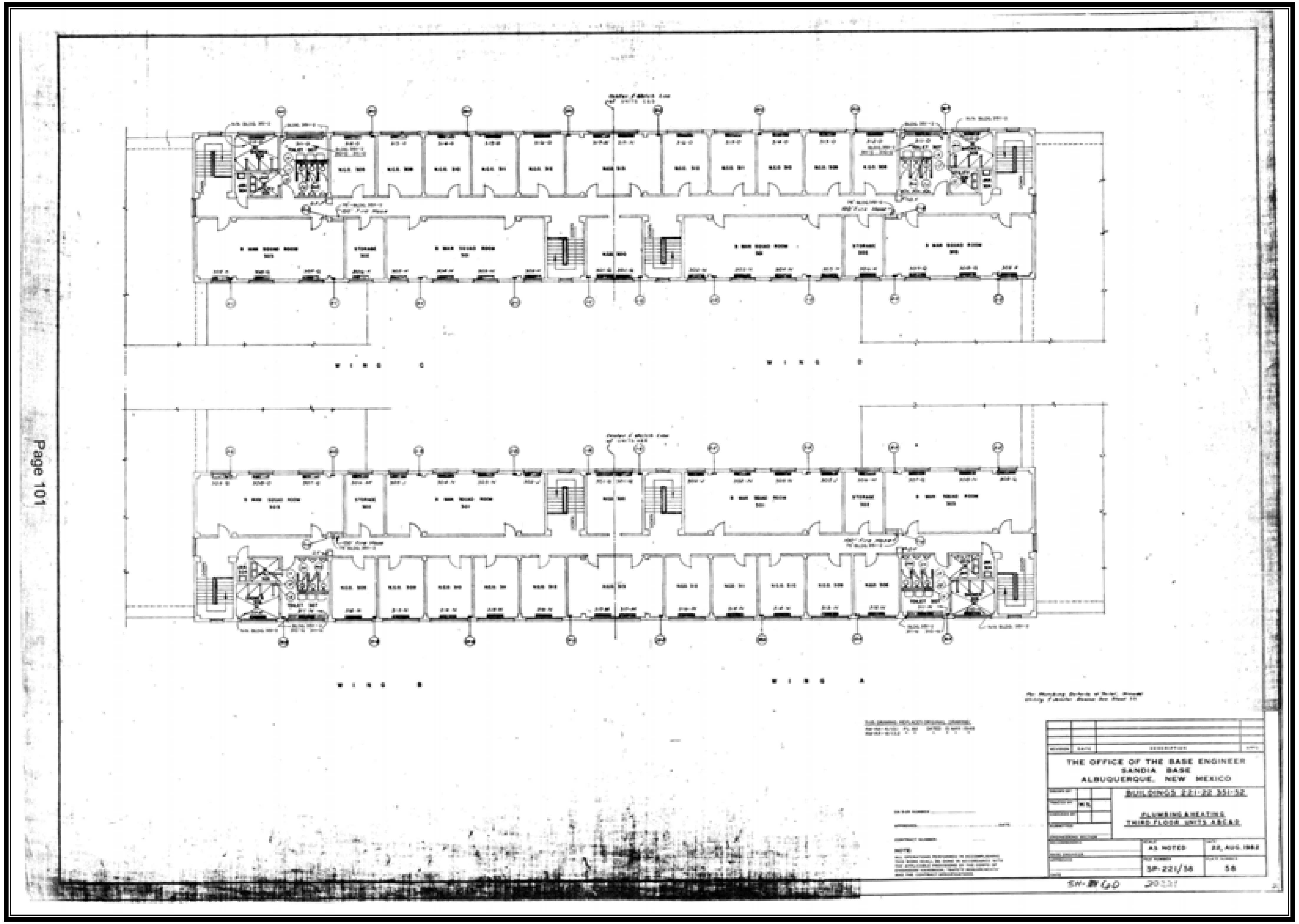


Plate 105 Original configuration of rooms, Building 20352 (Courtesy Kirtland Air Force Base)

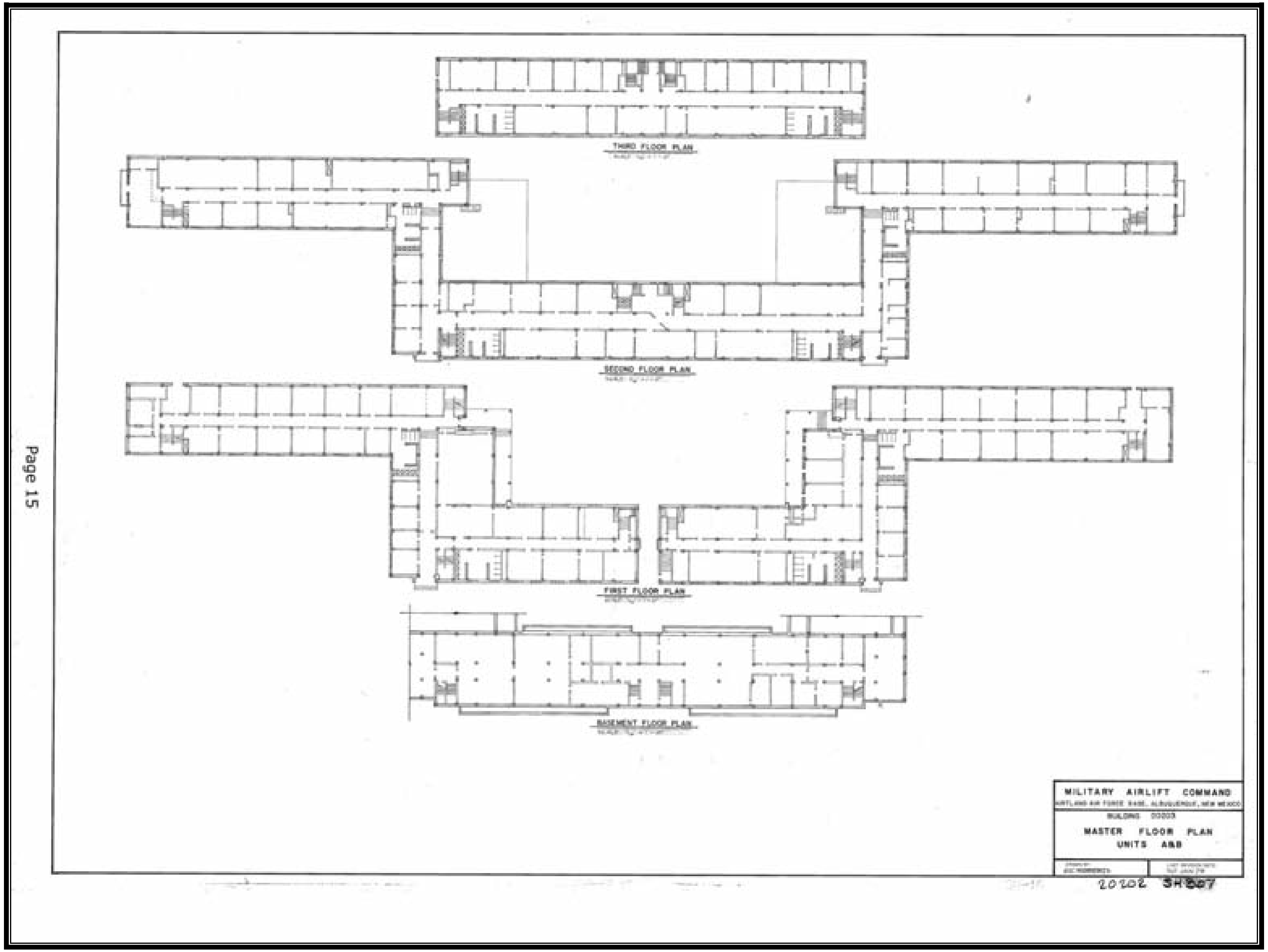


Plate 106 Composite floorplan, Building 20203 (Courtesy Kirtland Air Force Base)

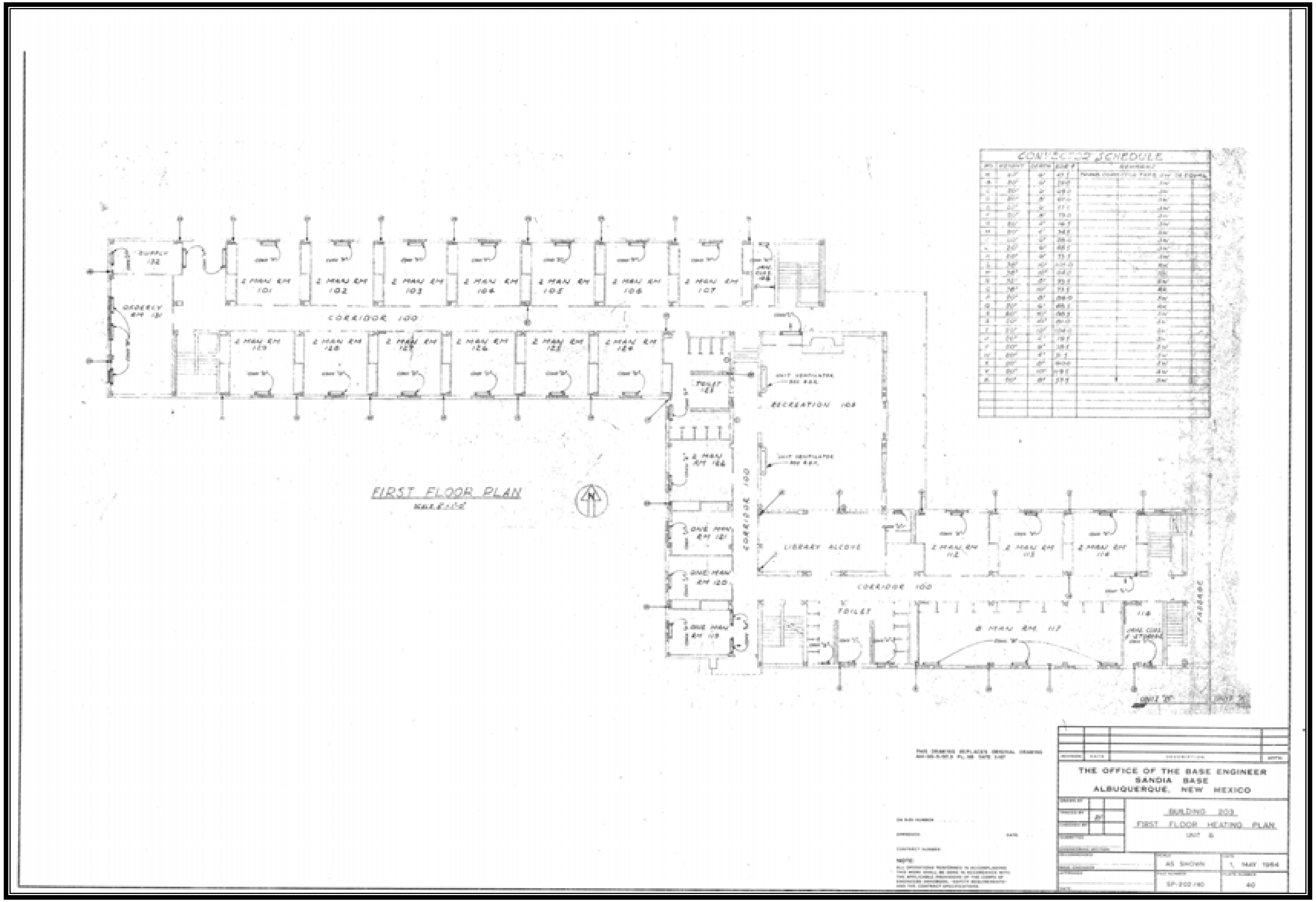


Plate 107 Original configuration or rooms, Building 20203. Note one-man, two-man, and eight-man rooms (Courtesy Kirtland Air Force Base)

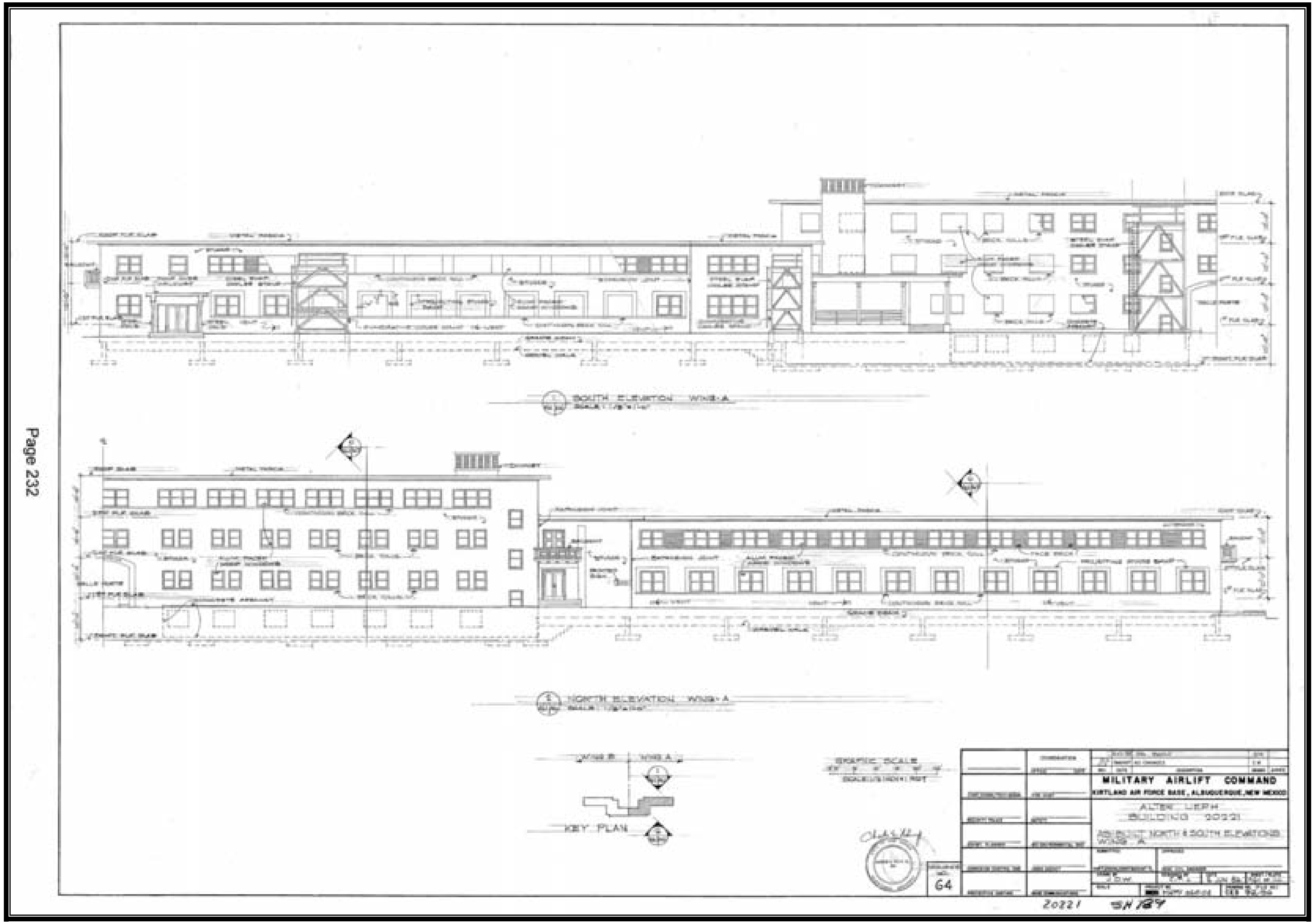


Plate 108 Building 20221 as it appeared in 1986 (Courtesy Kirtland Air Force Base)

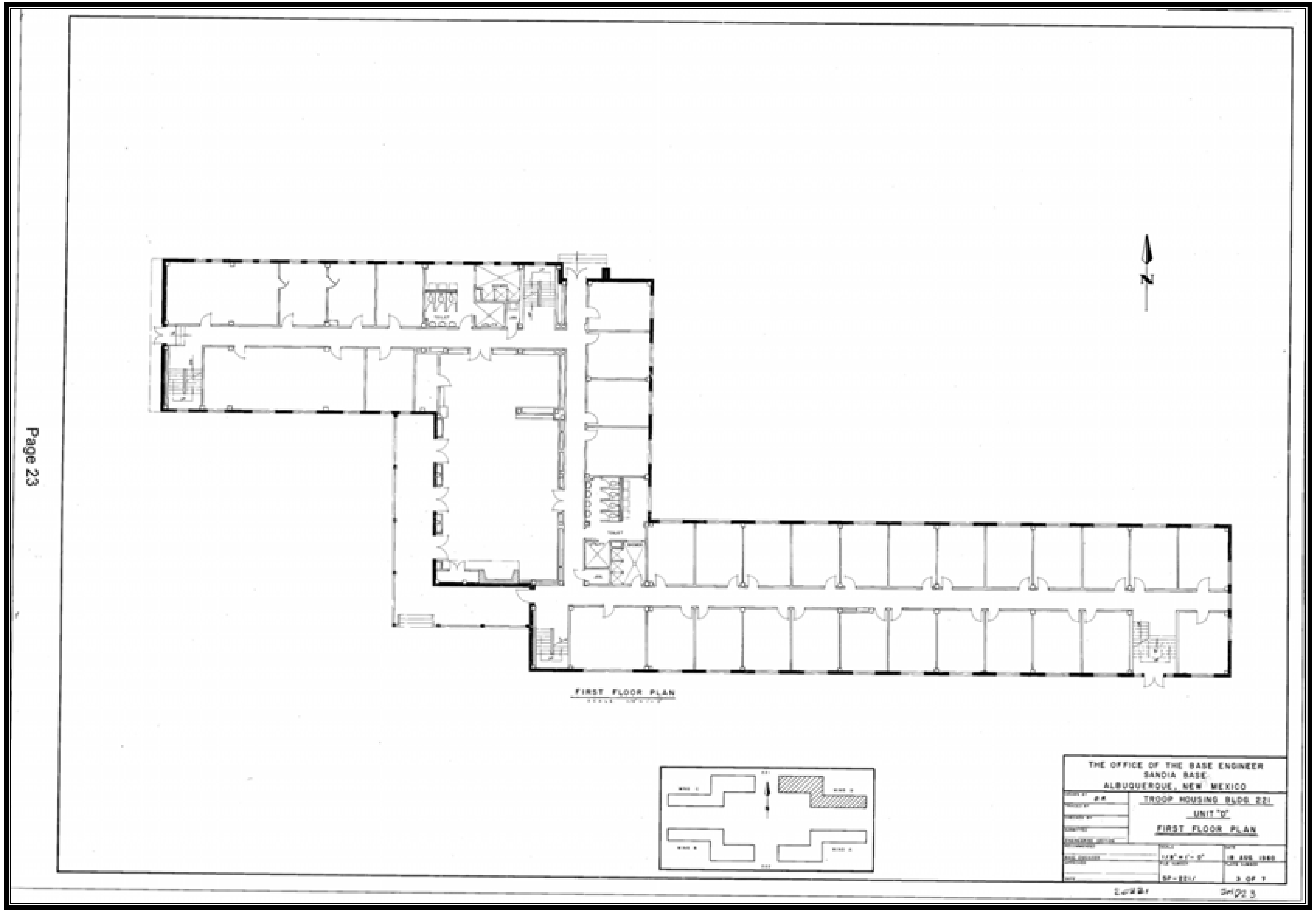


Plate 109 Composite floorplan, Building 20221 (Courtesy Kirtland Air Force Base)

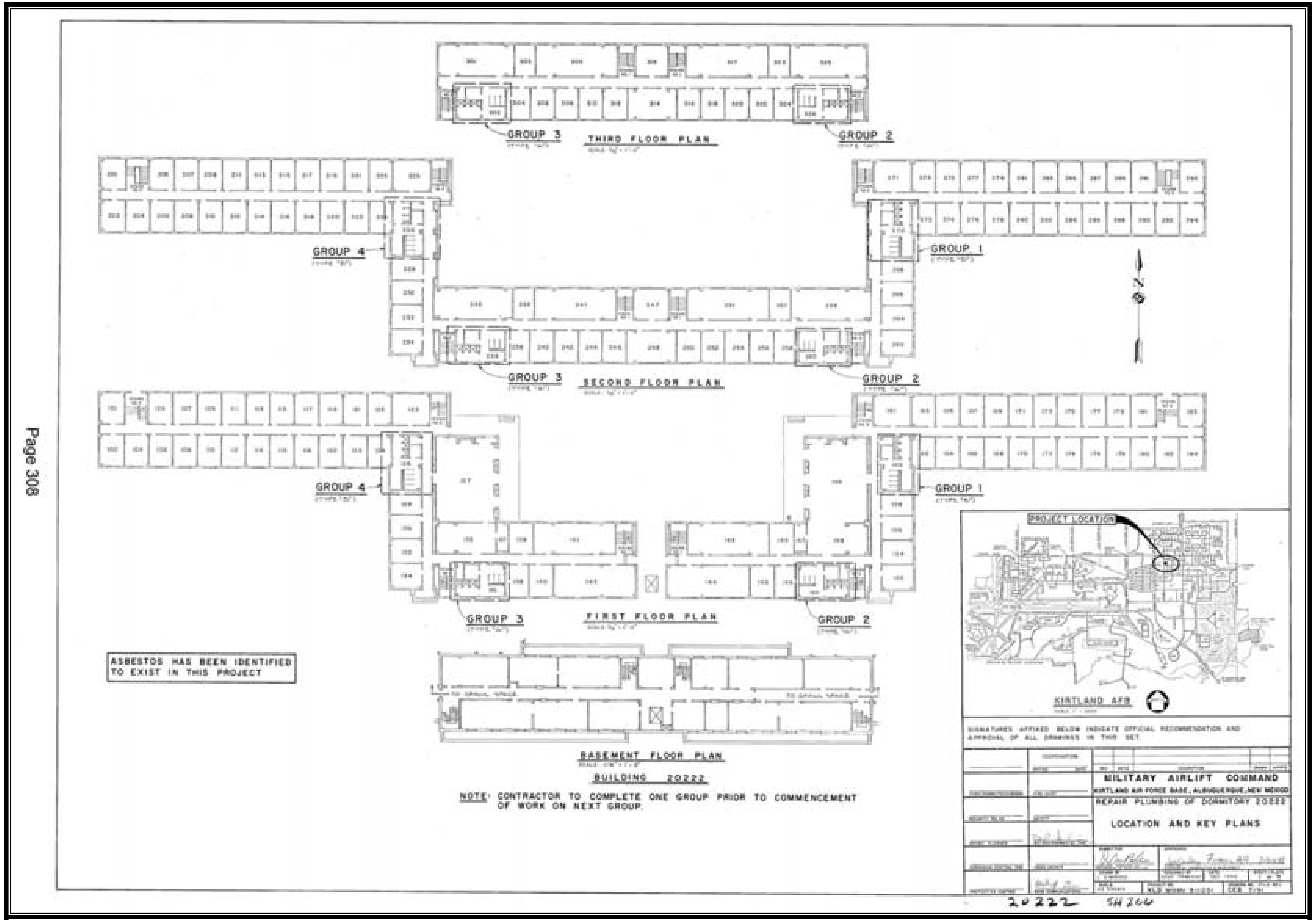

Page 308
GROUP 3
THIRD FLOOR PLAN
GROUP 2
GROUP 4
GROUP 1
N
GROUP 3
SECOND FLOOR PLAN
GROUP 2
GROUP 4
GROUP 1
PROJECT LOCATION
GROUP 3
FIRST FLOOR PLAN
GROUP 2
ASBESTOS HAS BEEN IDENTIFIED TO EXIST IN THIS PROJECT
TO CRAWL SPACE
TO CRAWL SPACE
KIRTLAND AFB
BASEMENT FLOOR PLAN
BUILDING 20222
NOTE: CONTRACTOR TO COMPLETE ONE GROUP PRIOR TO COMMENCEMENT OF WORK ON NEXT GROUP.
SIGNATURES AFFIXED BELOW INDICATE OFFICIAL RECOMMENDATION AND APPROVAL OF ALL DRAWINGS IN THIS SET.
MILITARY AIRLIFT COMMAND
KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO
REPAIR PLUMBING OF DORMITORY 20222
LOCATION AND KEY PLANS
20222
SH 266

Plate 110 Composite floorplan, Building 20222 (Courtesy Kirtland Air Force Base)

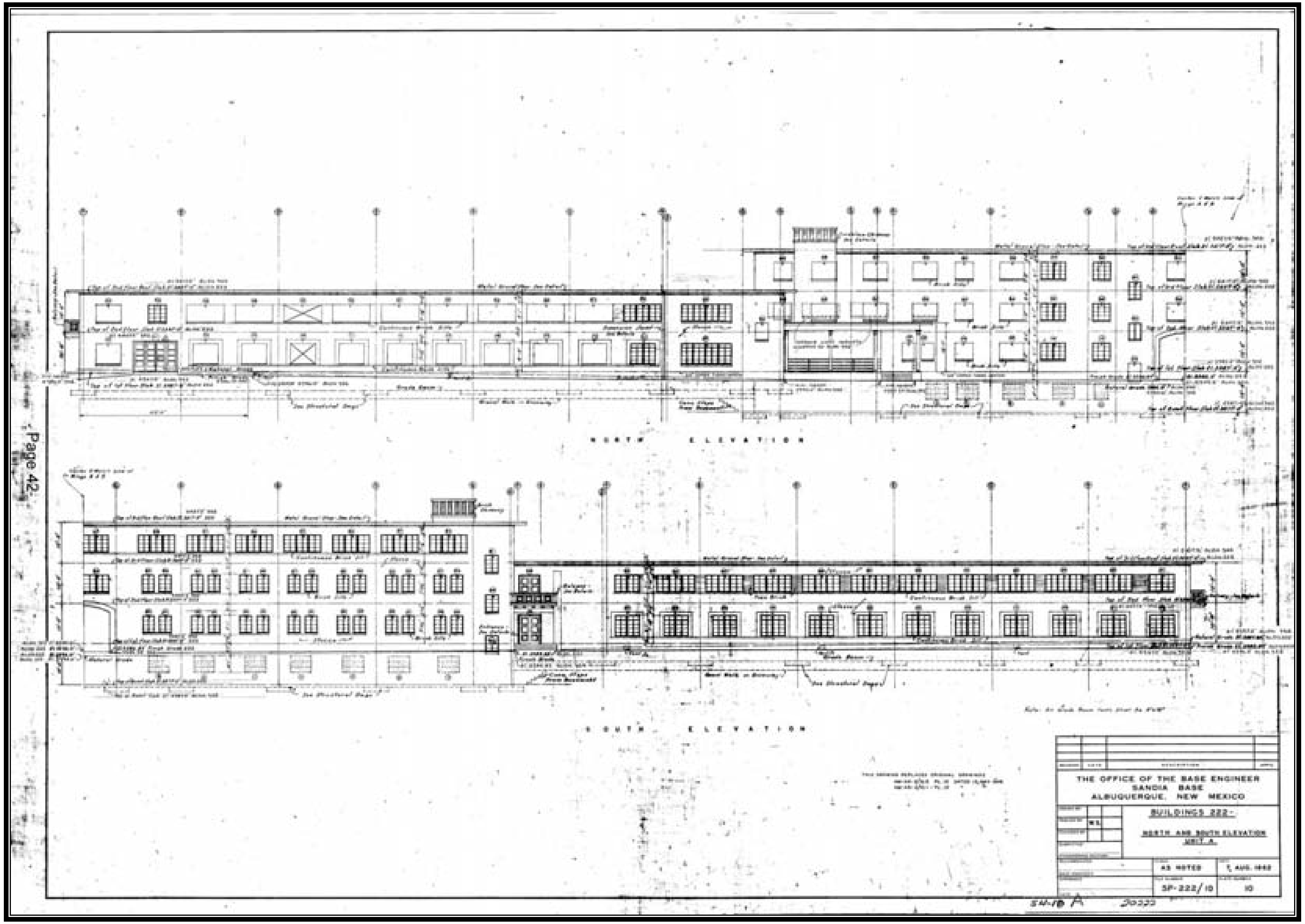


Plate 111 Building 20222 as it appeared in 1962 (Courtesy Kirtland Air Force Base)

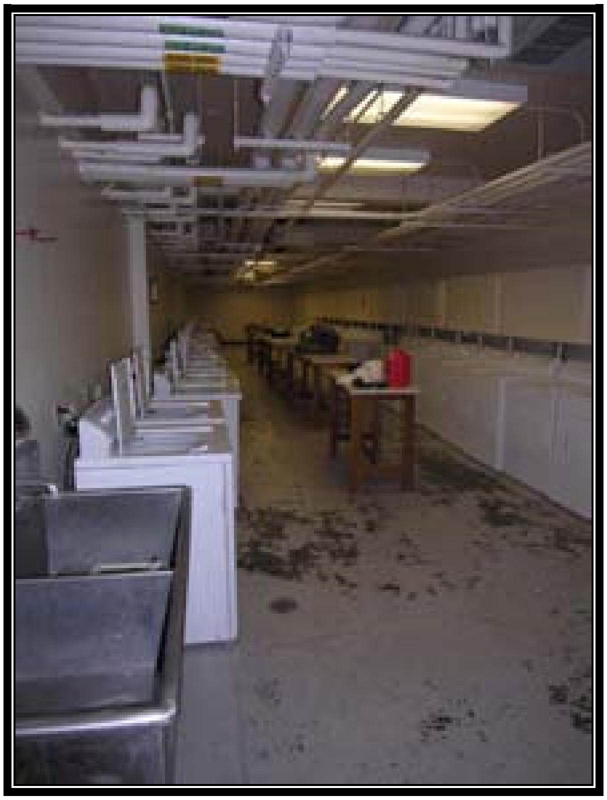


Plate 112 Basement laundry, Building 20222 (Photograph by RCG&A, 2008)

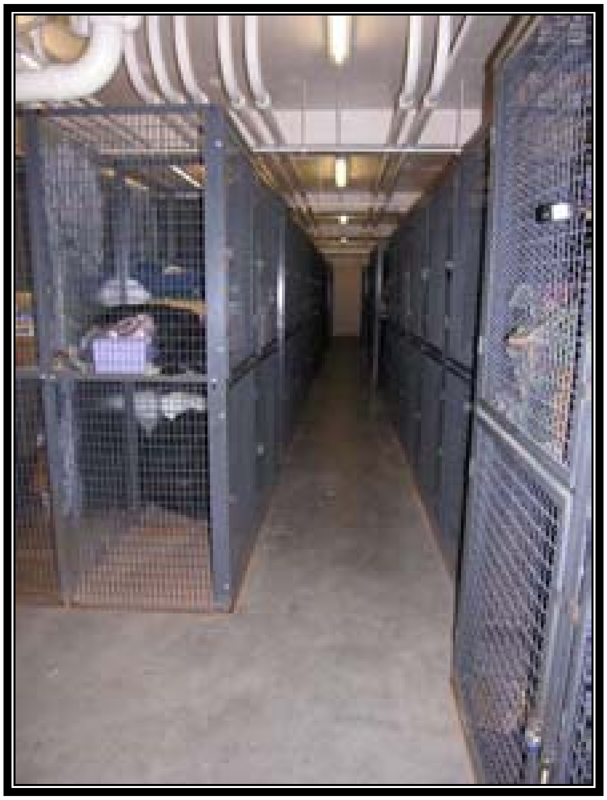


Plate 113 Storage units in basement of Building 20222 (Photograph by RCG&A, 2008)

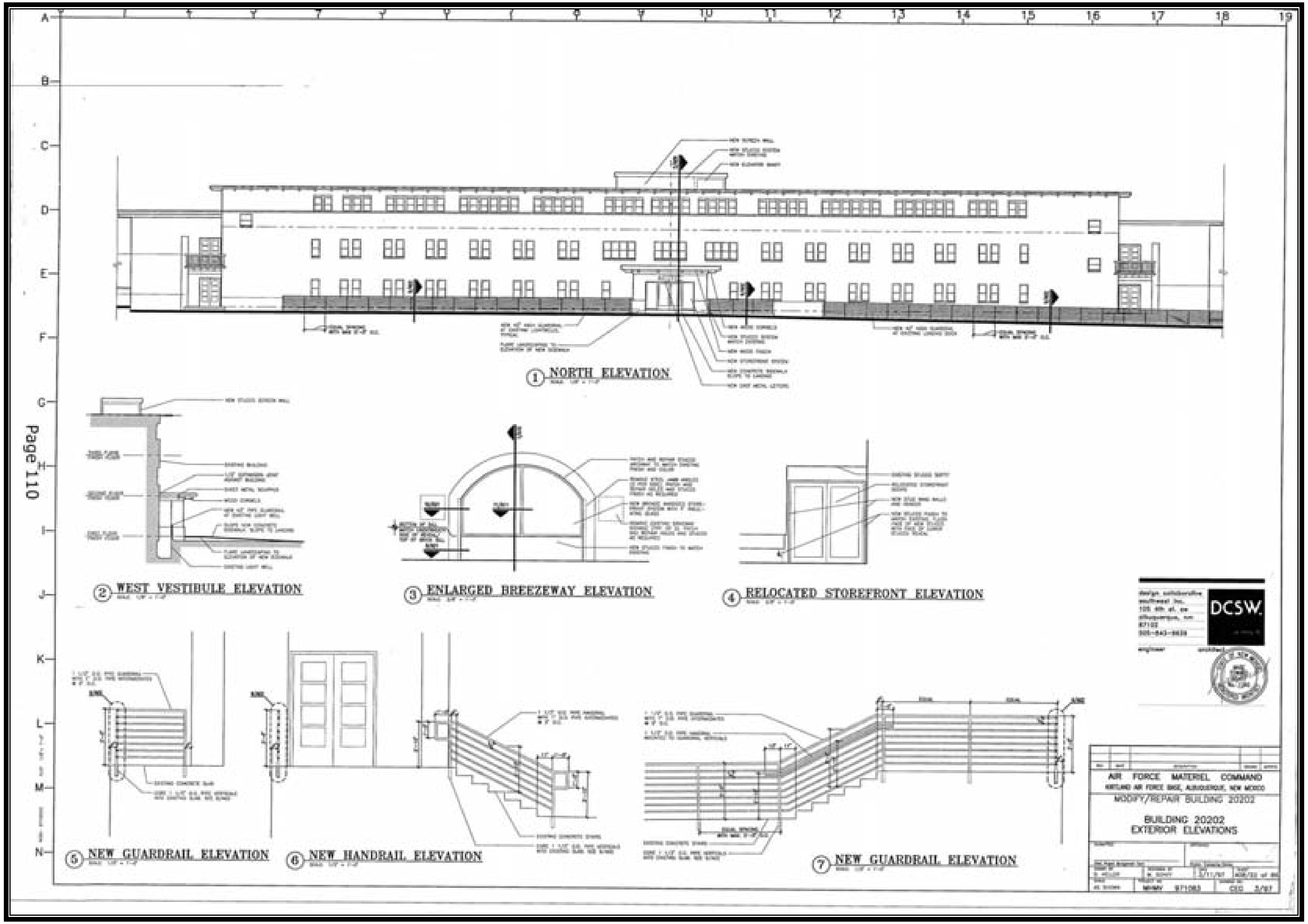

Page 110
NORTH ELEVATION
WEST VESTIBULE ELEVATION
ENLARGED BREEZEWAY ELEVATION
RELOCATED STOREFRONT ELEVATION
NEW GUARDRAIL ELEVATION
NEW HANDRAIL ELEVATION
NEW GUARDRAIL ELEVATION
DCSW
AIR FORCE MATERIEL COMMAND
KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO
MODIFY/REPAIR BUILDING 20202
BUILDING 20202
EXTERIOR ELEVATIONS

Plate 114 Exterior elevations, Building 20202, from drawings completed in 1997 (Courtesy Kirtland Air Force Base)

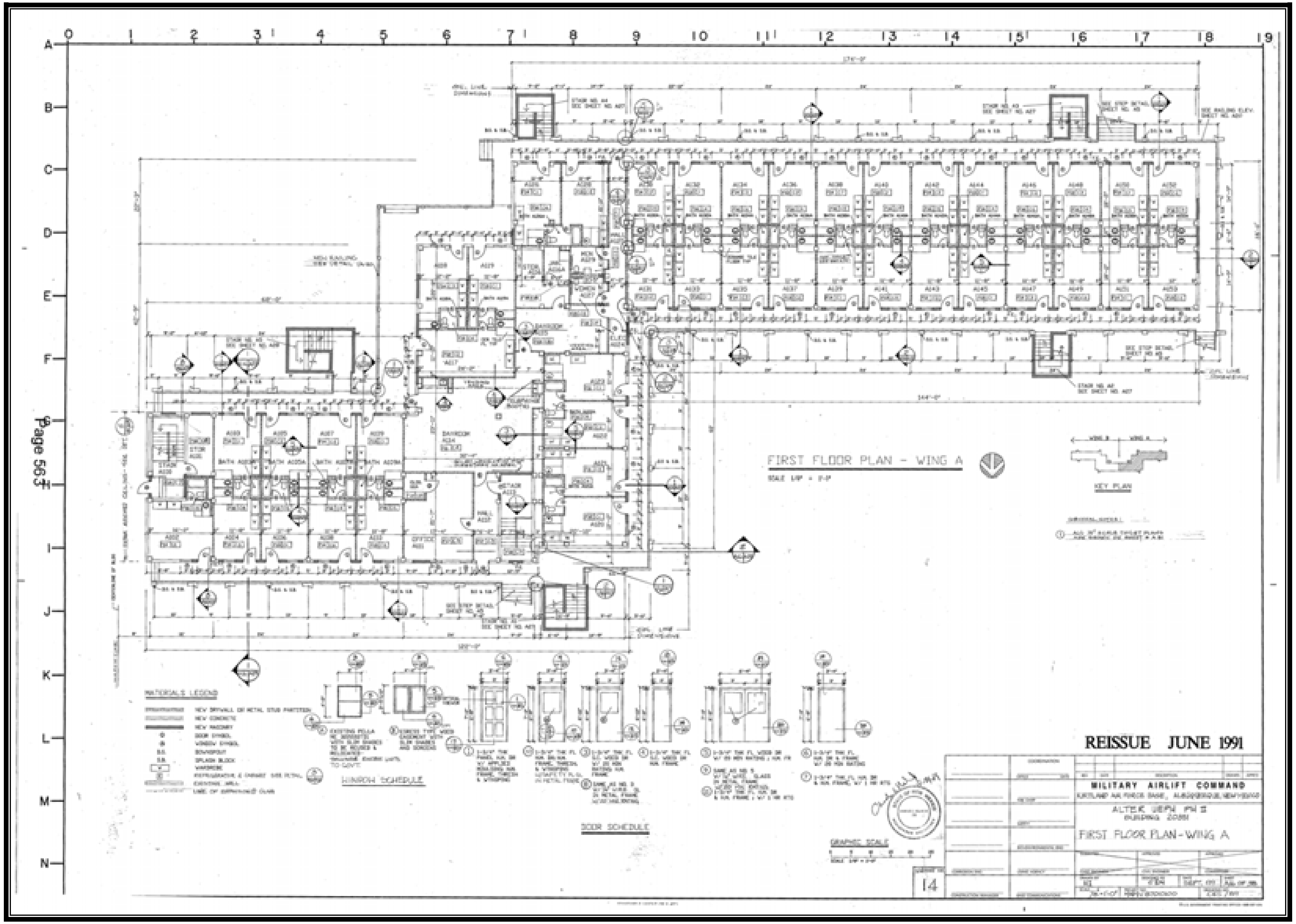


Plate 115 New floorplan of Building 20221 from drawings completed in 1989 (Courtesy Kirtland Air Force Base)

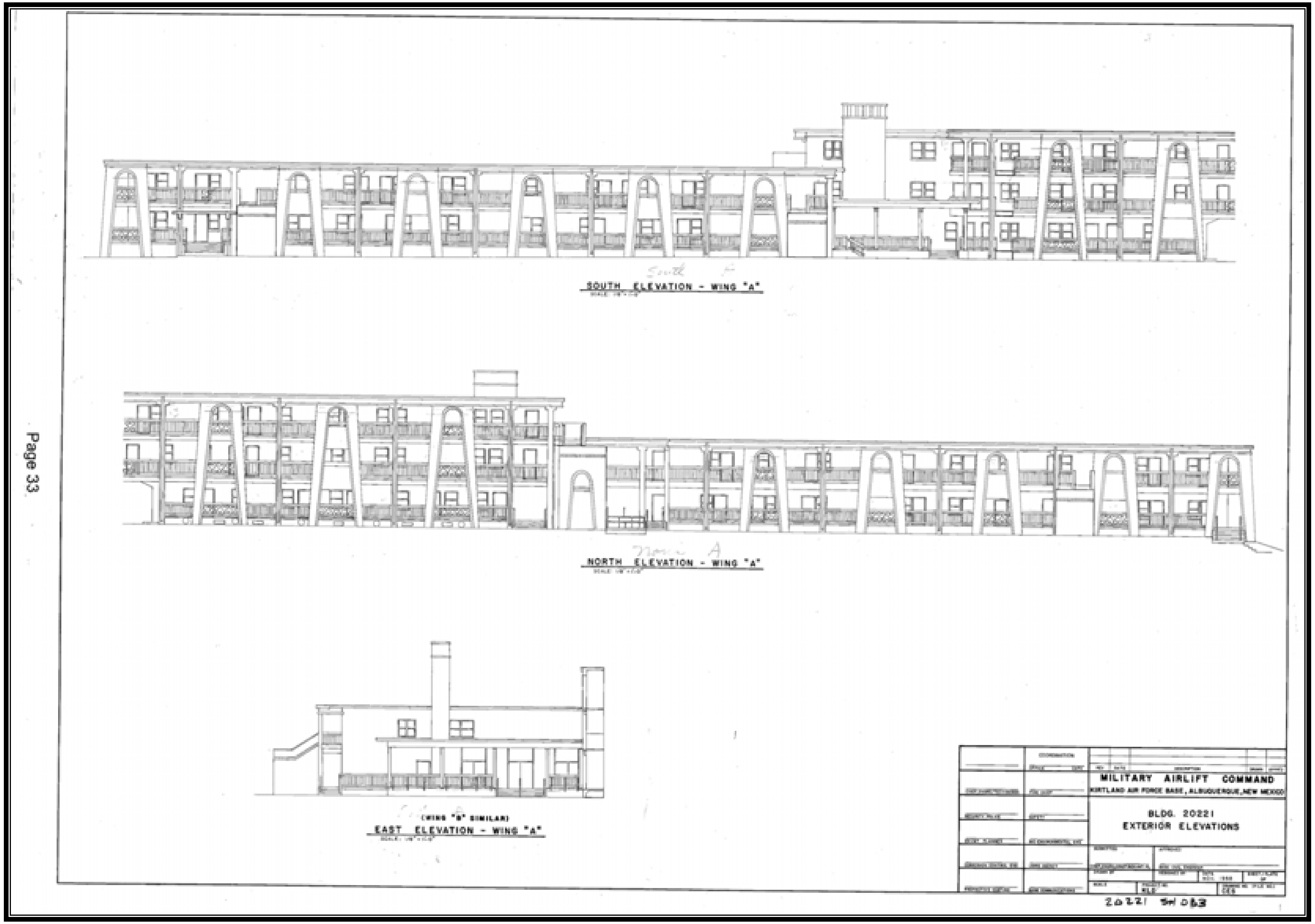

South A
SOUTH ELEVATION - WING "A"
North A
NORTH ELEVATION - WING "A"
(WING "B" SIMILAR)
EAST ELEVATION - WING "A"
Page 33
MILITARY AIRLIFT COMMAND
KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO
BLDG. 20221
EXTERIOR ELEVATIONS
20221 SH 063

Plate 116 Exterior elevations for Building 20221 from drawings completed in 1988 (Courtesy Kirtland Air Force Base)

Plate 117 South elevation of Building 20203 (Photograph by RCG&A, 2008)

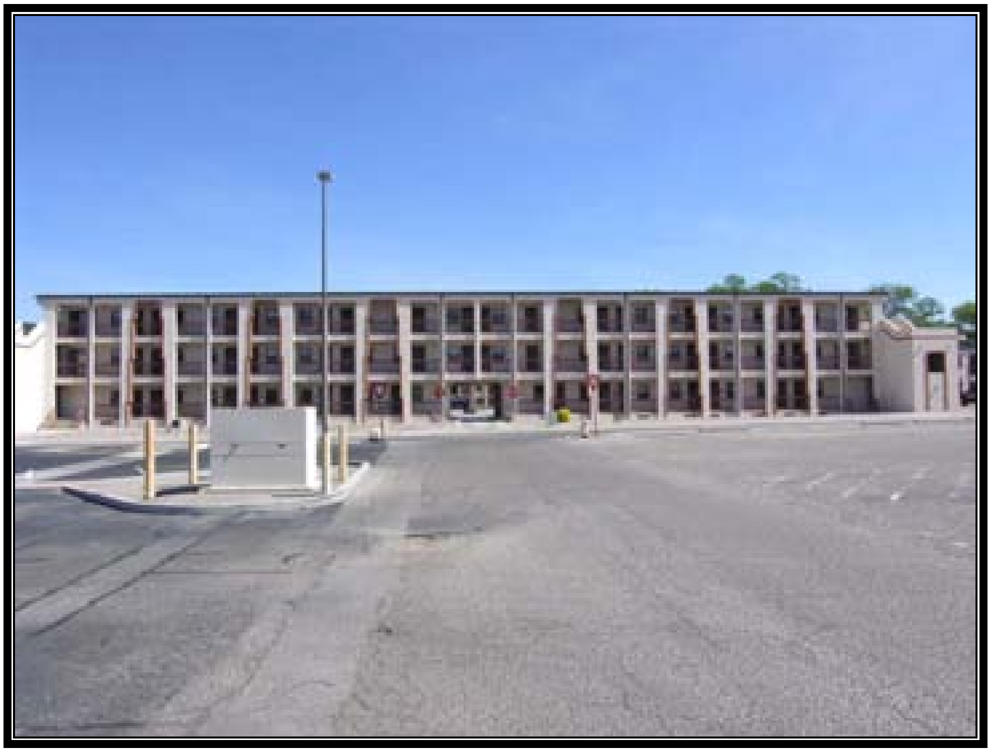


Plate 118 South elevation of Building 20222 (Photograph by RCG&A, 2008)

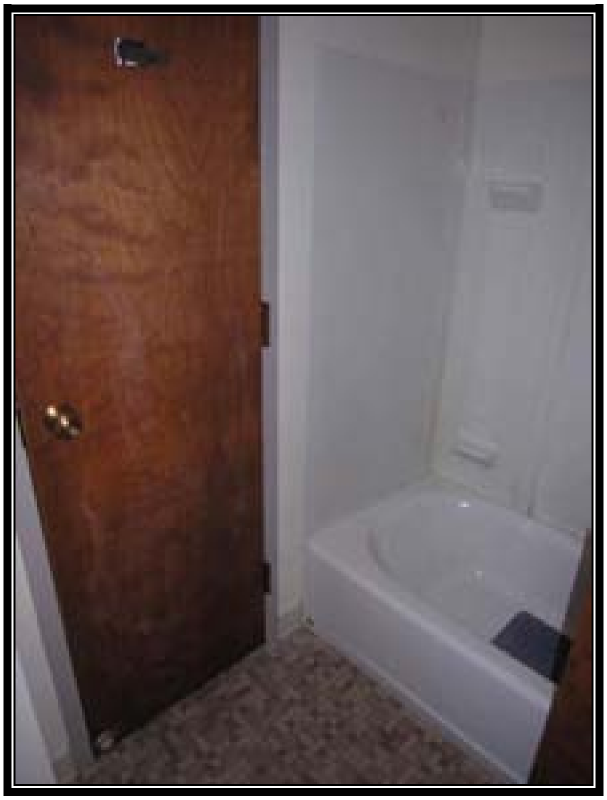


Plate 119 Interior of typical bathroom, Building 20222 (Photograph by RCG&A, 2008)

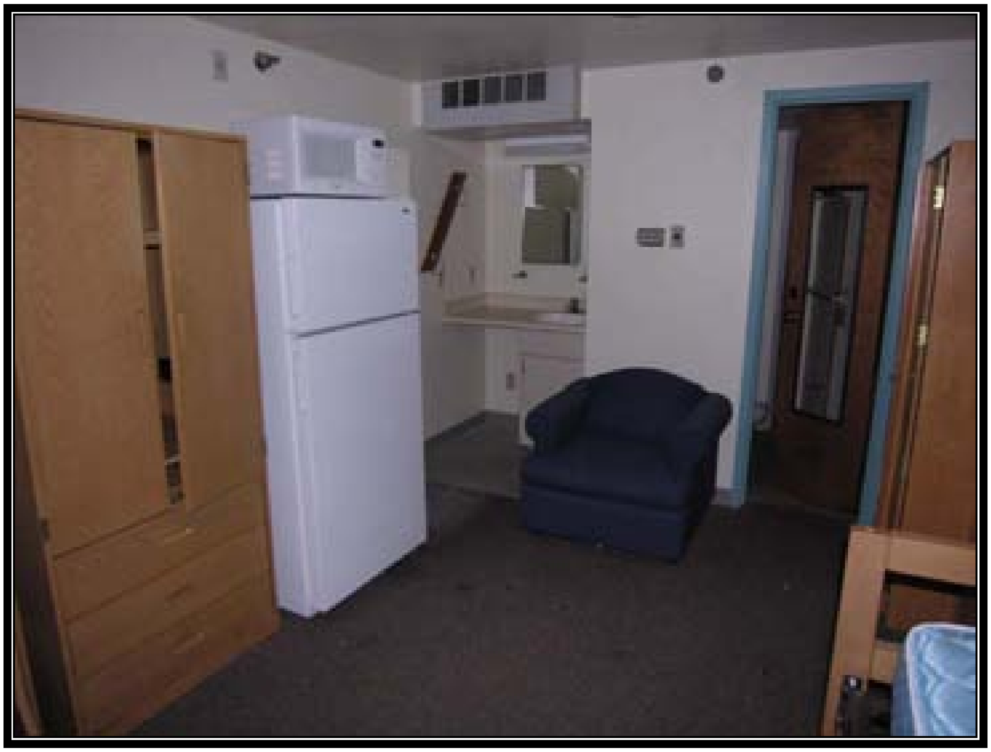


Plate 120 Interior of typical sleeping room, Building 20222 (Photograph by RCG&A, 2008)

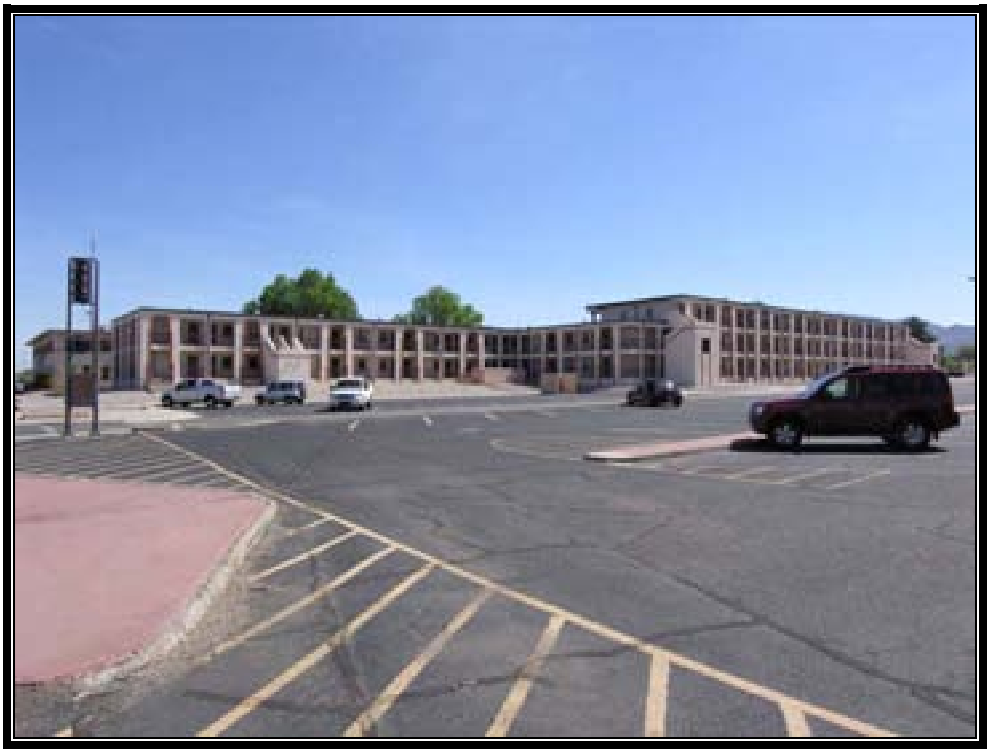


Plate 121 Building 20222 (Photograph by RCG&A, 2008)

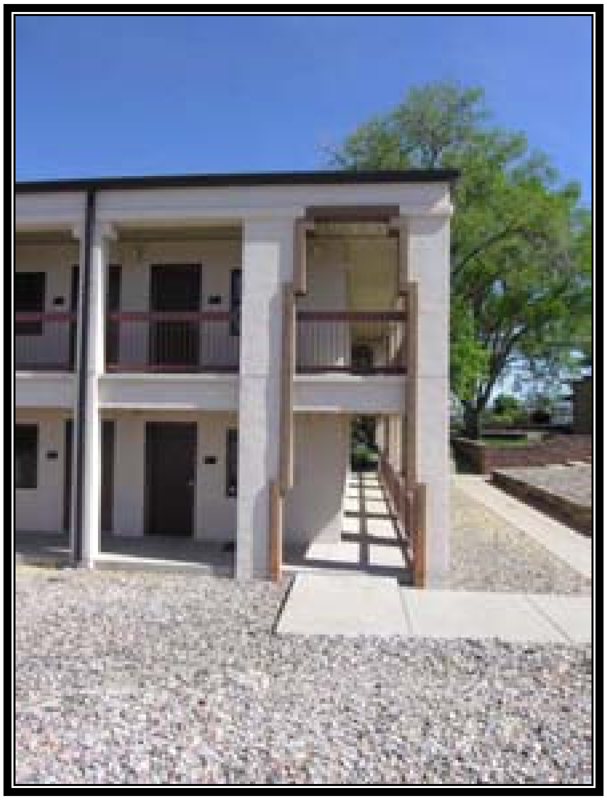


Plate 122 Detail of balcony columns, Building 20222 (Photograph by RCG&A, 2008)

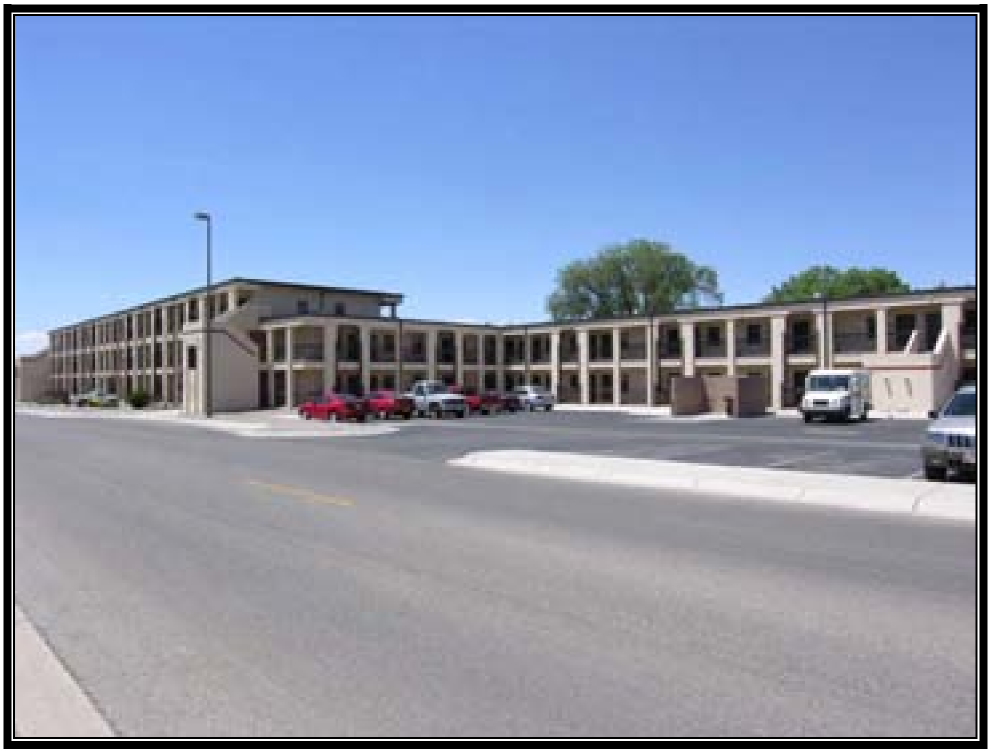


Plate 123 View looking northwest, Building 20352 (Photograph by RCG&A, 2008)

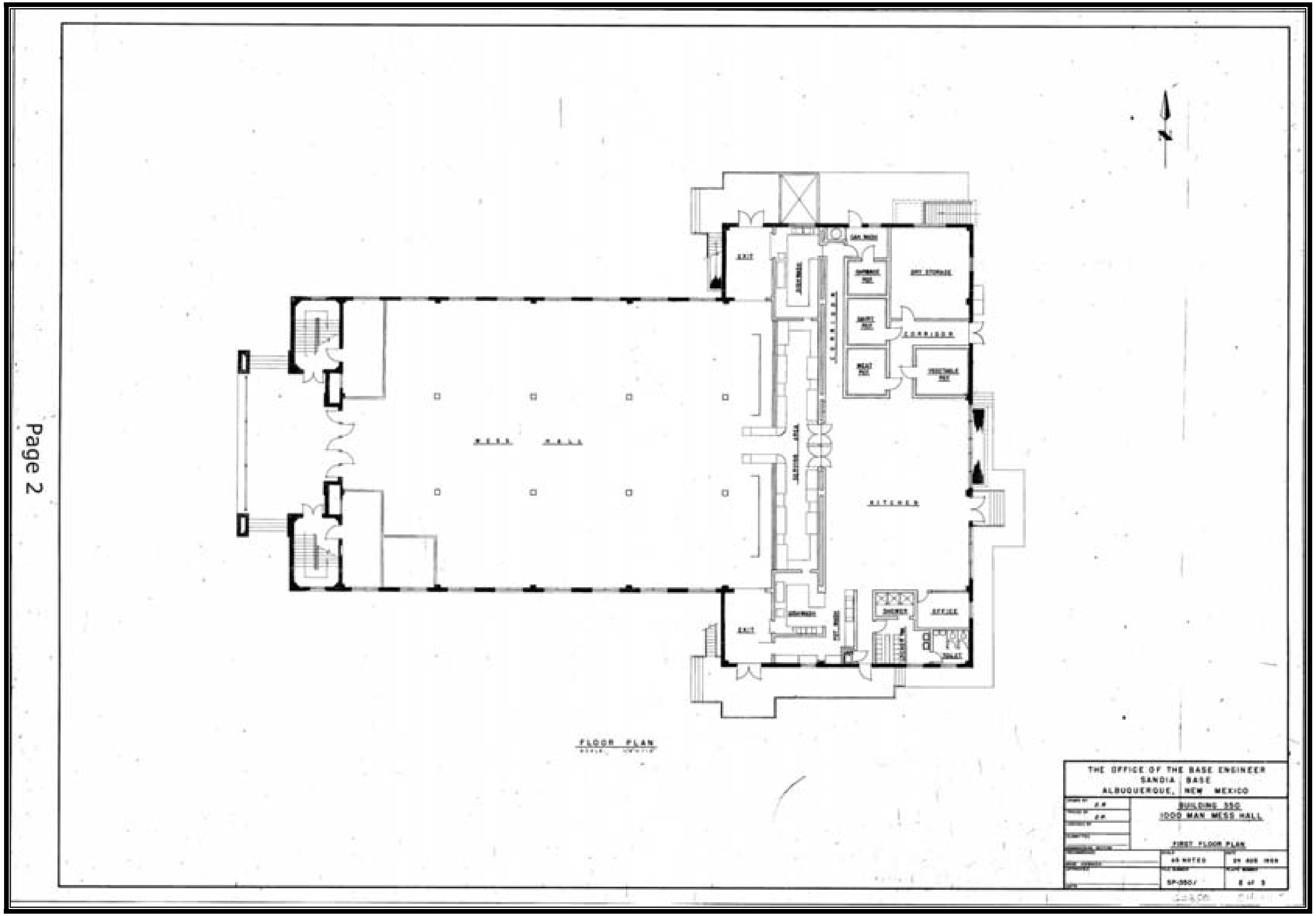


Plate 124 First floor plan of Building 20350 from drawing dated 1959 (Courtesy Kirtland Air Force Base)

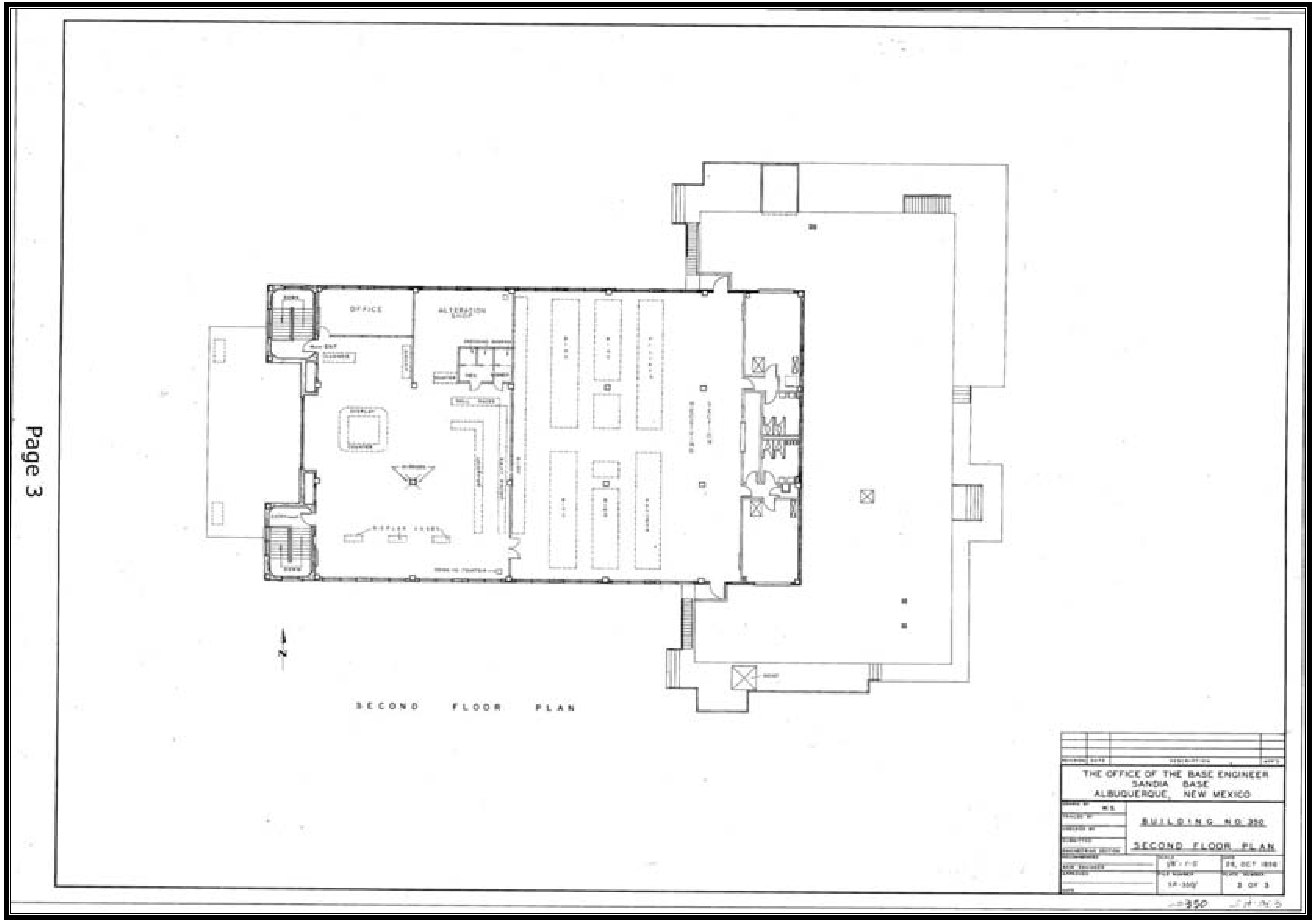


Plate 125 Second floor plan of Building 20350 from drawing dated 1956 (Courtesy Kirtland Air Force Base)

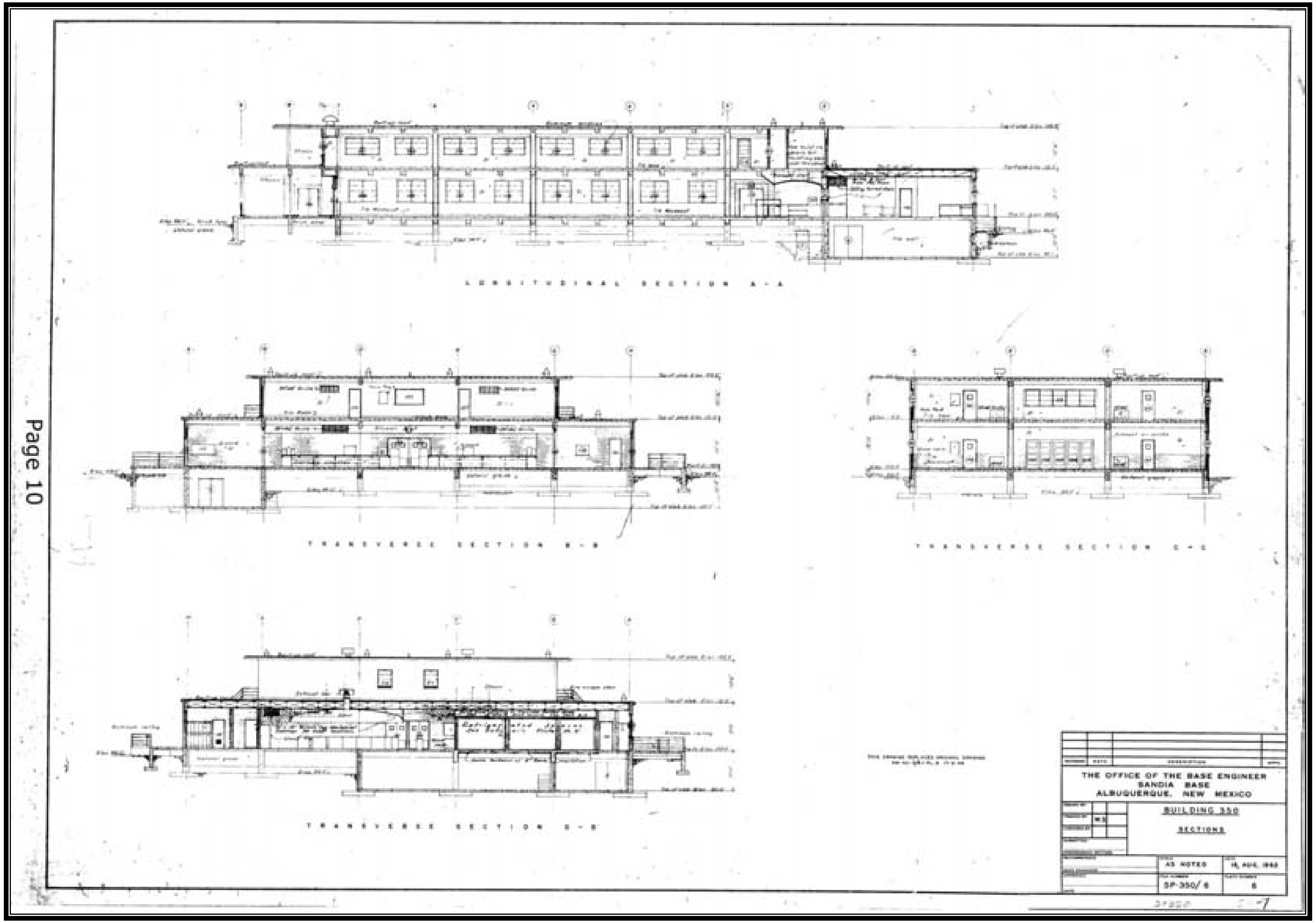


Plate 126 Elevations of Building 20350 from drawing dated 1962 (Courtesy Kirtland Air Force Base)

Plate 127 Entry and stair of Building 20350, the Thunderbird Inn (Photograph by RCG&A, 2008)

Plate 128 Addition to side and rear of Building 20350 (Photograph by RCG&A, 2008)

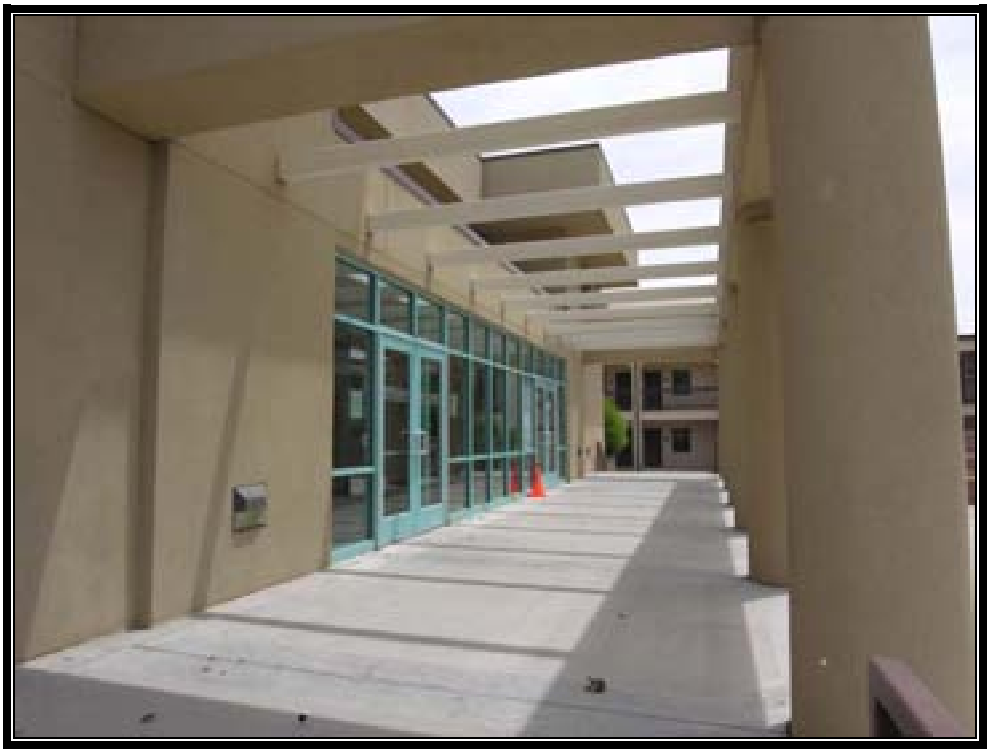


Plate 129 Courtyard area of Building 20350 (Photograph by RCG&A, 2008)

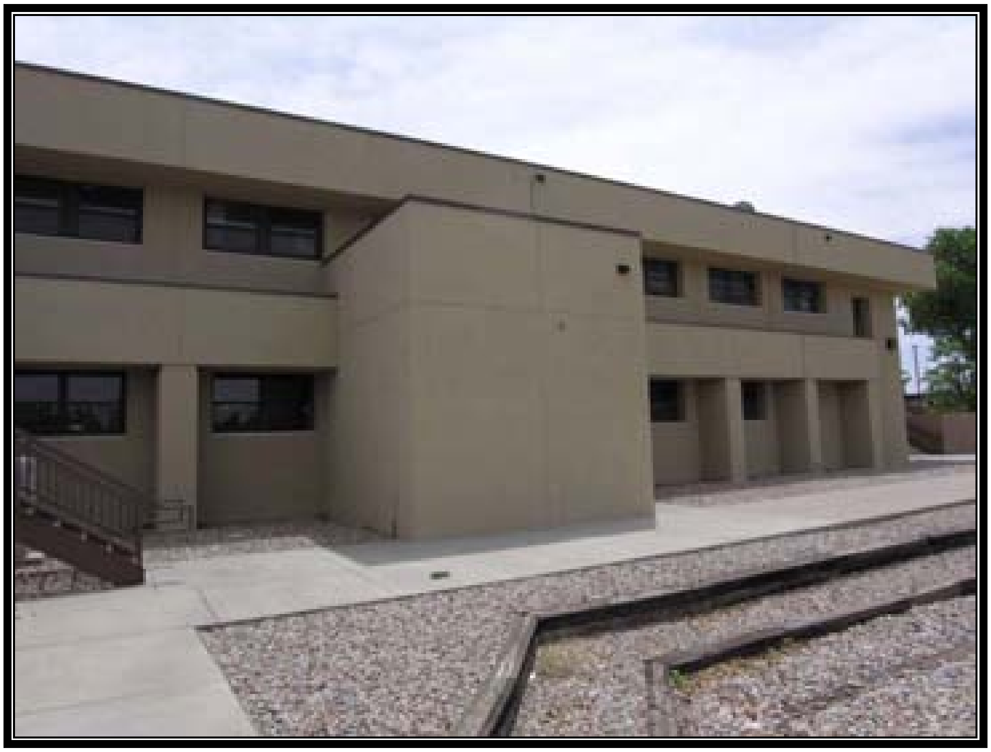


Plate 130 Side elevation, Building 20350, showing new windows and finish system (Photograph by RCG&A, 2008)

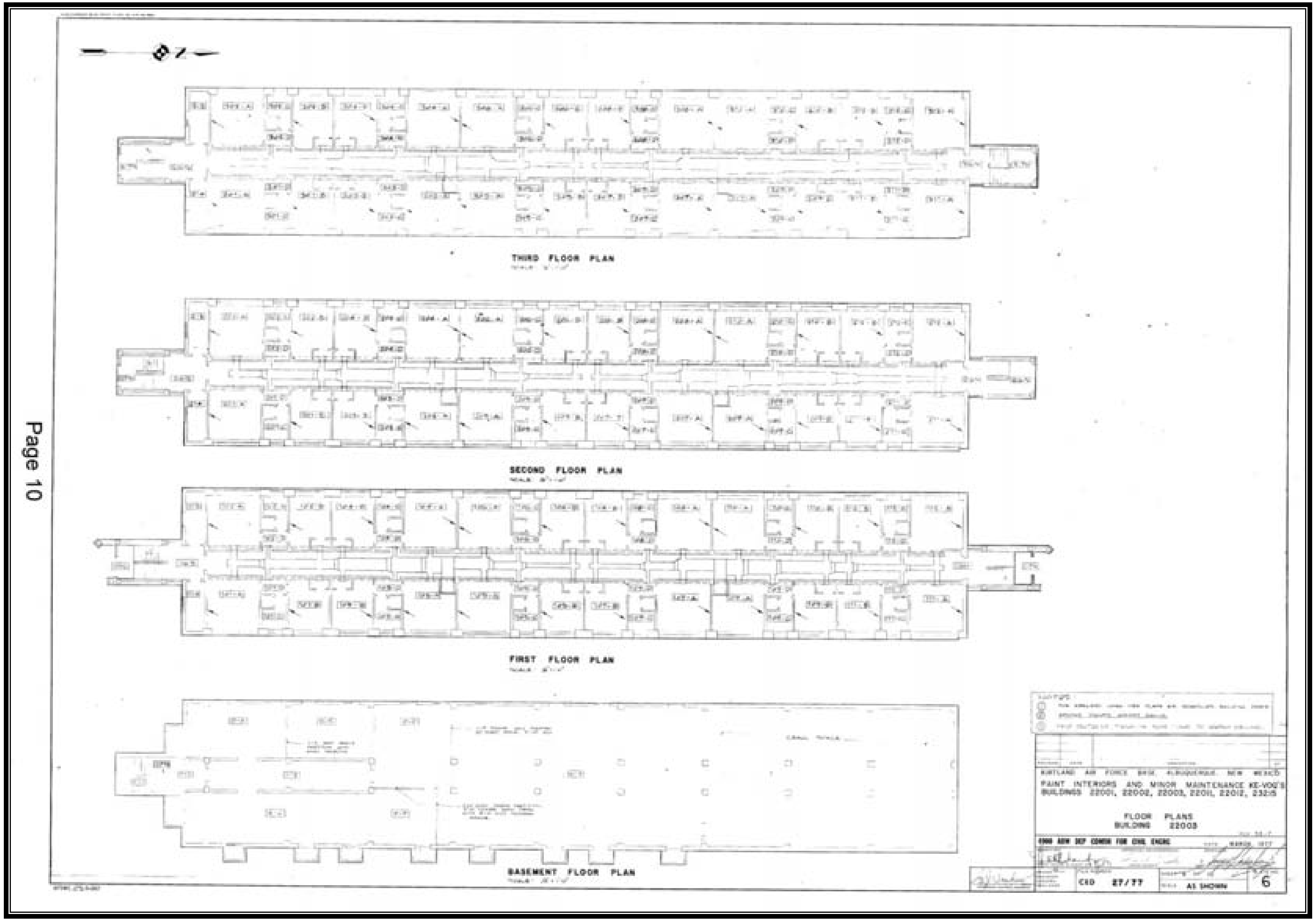

Page 10
THIRD FLOOR PLAN
SECOND FLOOR PLAN
FIRST FLOOR PLAN
BASEMENT FLOOR PLAN
KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO
PAINT INTERIORS AND MINOR MAINTENANCE KE-VOQ'S
BUILDINGS 22001, 22002, 22003, 22011, 22012, 23235
FLOOR PLANS
BUILDING 22003
CED 27/77
AS SHOWN
6

Plate 131 Floorplans of Building 22001 completed in 1977 (Courtesy Kirtland Air Force Base)

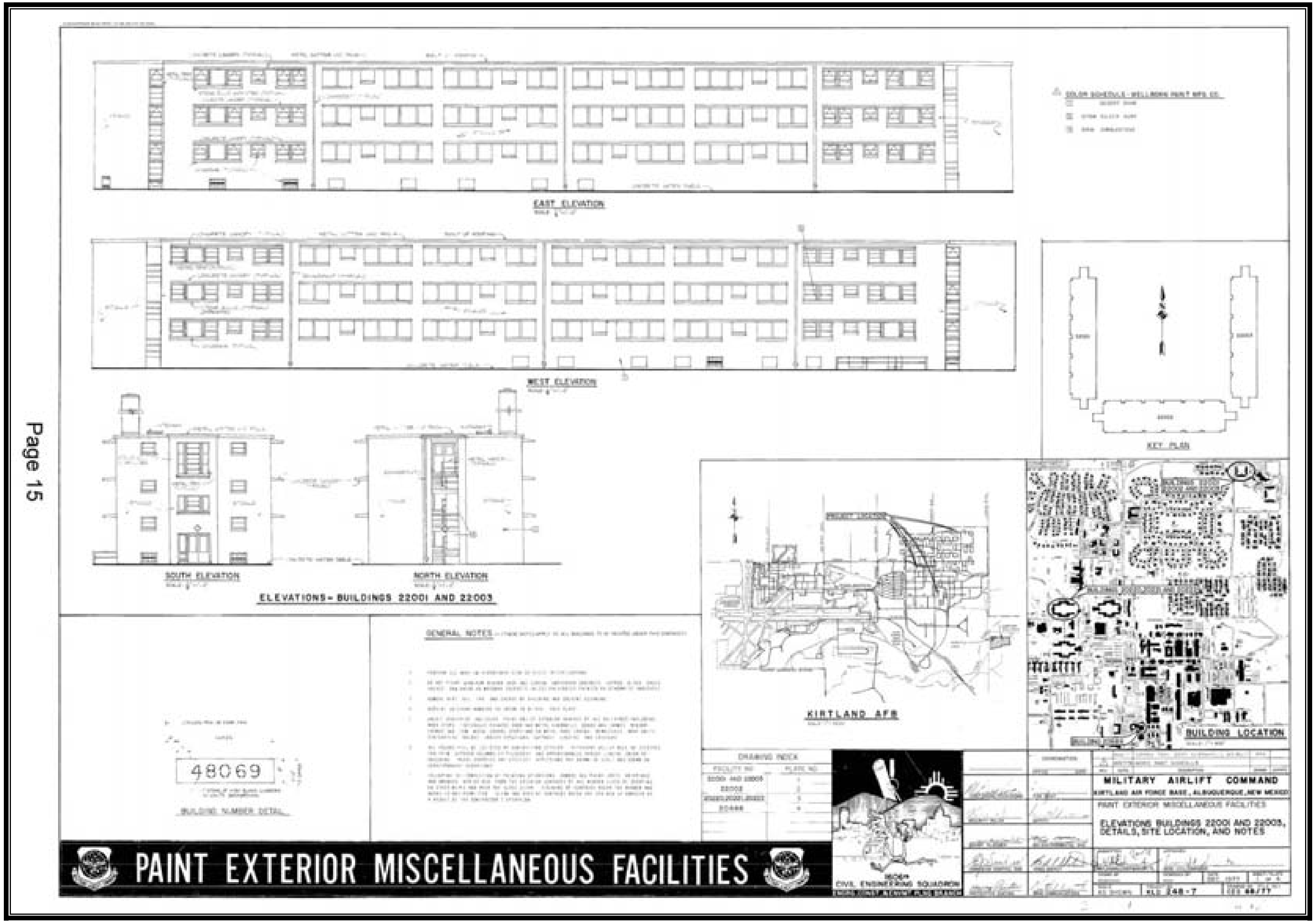

Page 15
EAST ELEVATION
WEST ELEVATION
SOUTH ELEVATION
NORTH ELEVATION
ELEVATIONS- BUILDINGS 22001 AND 22003
KEY PLAN
KIRTLAND AFB
BUILDING LOCATION
GENERAL NOTES
48069
BUILDING NUMBER DETAIL
DRAWING INDEX
PAINT EXTERIOR MISCELLANEOUS FACILITIES
CIVIL ENGINEERING SQUADRON
MILITARY AIRLIFT COMMAND
KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO
PAINT EXTERIOR MISCELLANEOUS FACILITIES
ELEVATIONS BUILDINGS 22001 AND 22003, DETAILS, SITE LOCATION, AND NOTES
248-7

Plate 132 Exterior appearance of Buildings 22001, 22002, and 22003 in 1977 (Courtesy Kirtland Air Force Base)

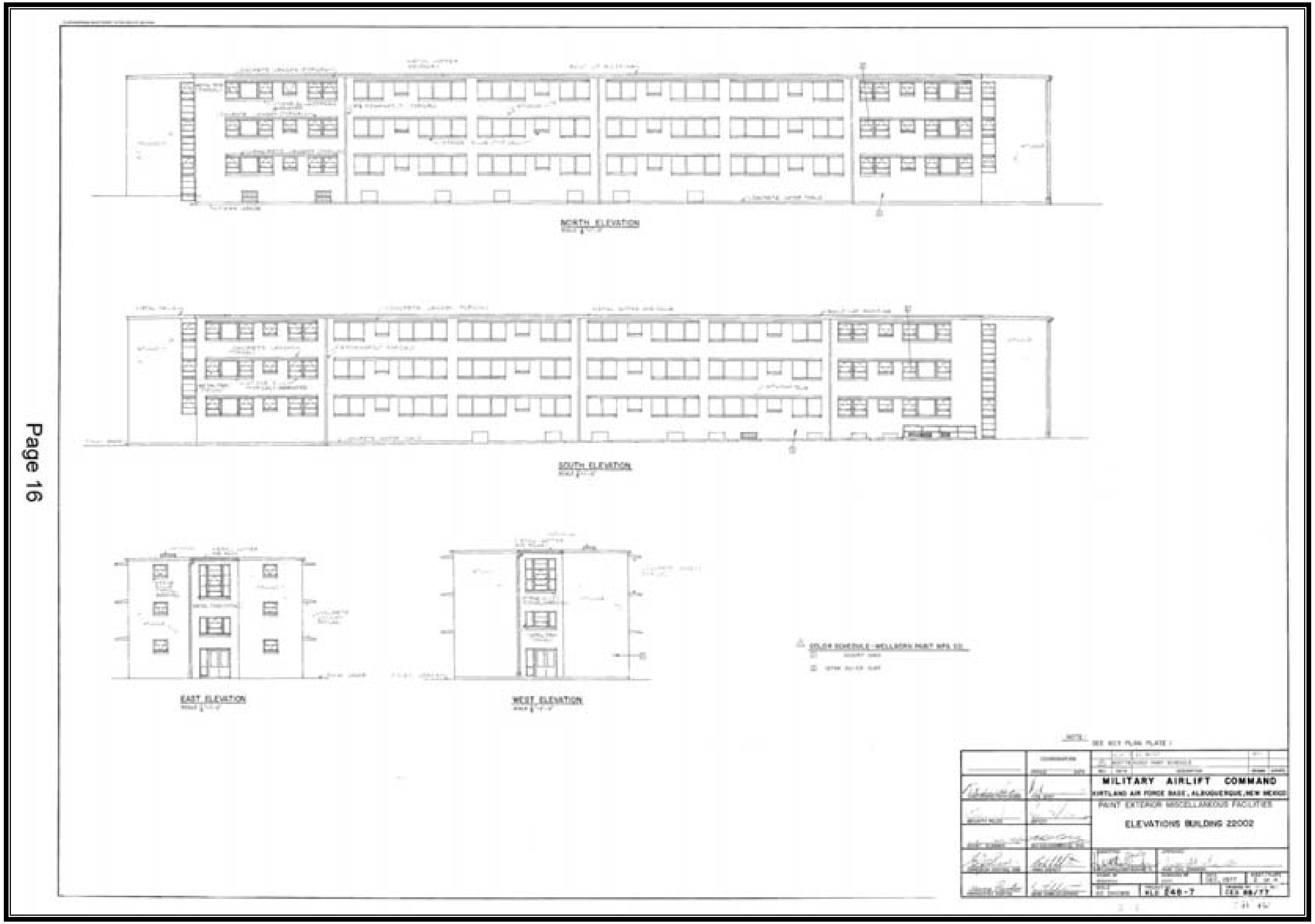

Page 16
NORTH ELEVATION
SOUTH ELEVATION
EAST ELEVATION
WEST ELEVATION
COLOR SCHEDULE - WELLBORN PAINT MFG. CO.
NOTE: SEE KEY PLAN PLATE 1
MILITARY AIRLIFT COMMAND
KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO
PAINT EXTERIOR MISCELLANEOUS FACILITIES
ELEVATIONS BUILDING 22002
OCT. 1977
KLE 248-7
CES 88/77

Plate 133 Exterior elevations of Building 22002 in 1977 (Courtesy Kirtland Air Force Base)

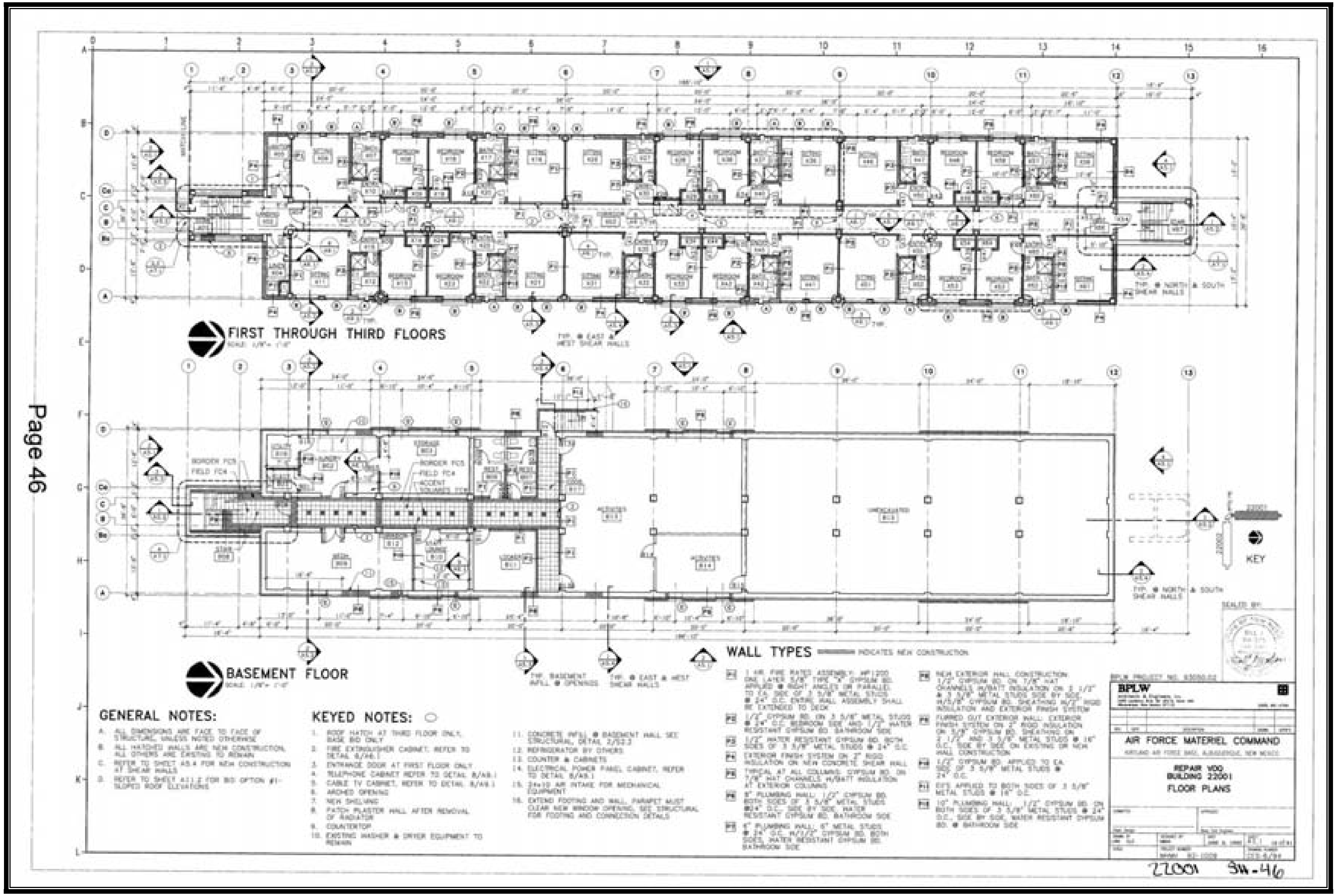

Page 46
FIRST THROUGH THIRD FLOORS
BASEMENT FLOOR
SCALE: 1/8"= 1'-0"
TYP. @ NORTH & SOUTH SHEAR WALLS
TYP. @ EAST & WEST SHEAR WALLS
TYP. BASEMENT INFILL @ OPENINGS
KEY
GENERAL NOTES:
A. ALL DIMENSIONS ARE FACE TO FACE OF STRUCTURE, UNLESS NOTED OTHERWISE
B. ALL HATCHED WALLS ARE NEW CONSTRUCTION, ALL OTHERS ARE EXISTING TO REMAIN
C. REFER TO SHEET A5.4 FOR NEW CONSTRUCTION AT SHEAR WALLS
D. REFER TO SHEET A11.2 FOR BID OPTION #1-SLOPED ROOF ELEVATIONS
KEYED NOTES: ○
1. ROOF HATCH AT THIRD FLOOR ONLY, BASE BID ONLY
2. FIRE EXTINGUISHER CABINET, REFER TO DETAIL 6/A6.1
3. ENTRANCE DOOR AT FIRST FLOOR ONLY
4. TELEPHONE CABINET REFER TO DETAIL 8/A6.1
5. CABLE TV CABINET, REFER TO DETAIL 8/A6.1
6. ARCHED OPENING
7. NEW SHELVING
8. PATCH PLASTER WALL AFTER REMOVAL OF RADIATOR
9. COUNTERTOP
10. EXISTING WASHER & DRYER EQUIPMENT TO REMAIN
11. CONCRETE INFILL @ BASEMENT WALL SEE STRUCTURAL DETAIL 2/S2.2
12. REFRIGERATOR BY OTHERS
13. COUNTER & CABINETS
14. ELECTRICAL POWER PANEL CABINET, REFER TO DETAIL 8/A6.1
15. 24x12 AIR INTAKE FOR MECHANICAL EQUIPMENT
16. EXTEND FOOTING AND WALL, PARAPET MUST CLEAR NEW WINDOW OPENING, SEE STRUCTURAL FOR FOOTING AND CONNECTION DETAILS
WALL TYPES
INDICATES NEW CONSTRUCTION
BPLW
AIR FORCE MATERIEL COMMAND
KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO
REPAIR VOQ
BUILDING 22001
FLOOR PLANS
22001 3W-46

Plate 134 New floorplan for Building 22001 completed in 1995 (Courtesy Kirtland Air Force Base)

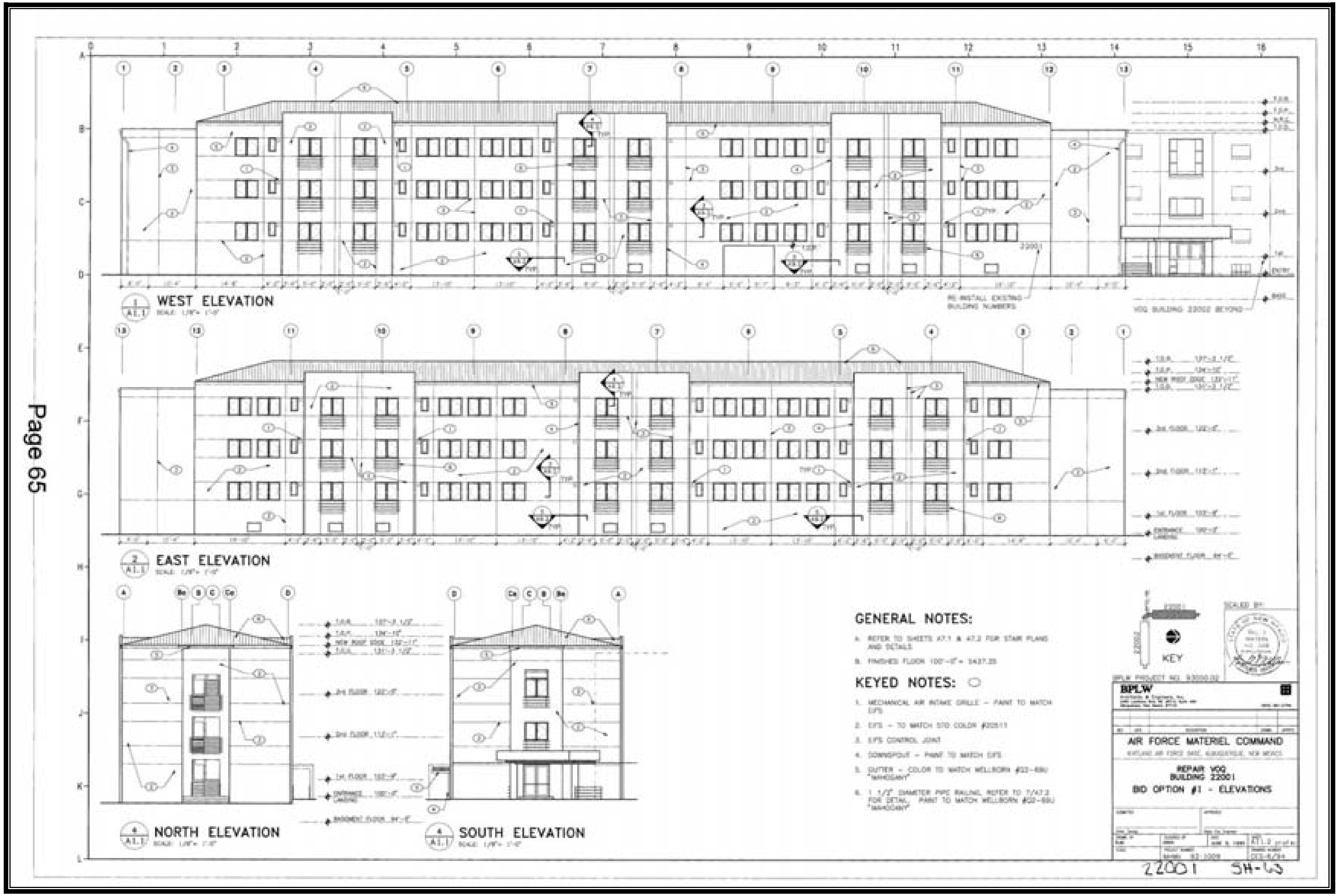

Page 65
WEST ELEVATION
SCALE: 1/8" = 1'-0"
RE-INSTALL EXISTING BUILDING NUMBERS
VOQ BUILDING 22002 BEYOND
EAST ELEVATION
SCALE: 1/8" = 1'-0"
NORTH ELEVATION
SCALE: 1/8" = 1'-0"
SOUTH ELEVATION
SCALE: 1/8" = 1'-0"
GENERAL NOTES:
A. REFER TO SHEETS A7.1 & A7.2 FOR STAIR PLANS AND DETAILS
B. FINISHED FLOOR 100'-0" = 5437.25
KEYED NOTES:
1. MECHANICAL AIR INTAKE GRILLE – PAINT TO MATCH EIFS
2. EIFS – TO MATCH STD COLOR #20511
3. EIFS CONTROL JOINT
4. DOWNSPOUT – PAINT TO MATCH EIFS
5. GUTTER – COLOR TO MATCH WELLBORN #22-69U "MAHOGANY"
6. 1 1/2" DIAMETER PIPE RAILING. REFER TO 7/A7.2 FOR DETAIL. PAINT TO MATCH WELLBORN #22-69U "MAHOGANY"
KEY
22001
BPLW
AIR FORCE MATERIEL COMMAND
KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO
REPAIR VOQ
BUILDING 22001
BID OPTION #1 – ELEVATIONS
22001 SH-63

Plate 135 New elevations for Building 22001 completed in 1995 (Courtesy Kirtland Air Force Base)

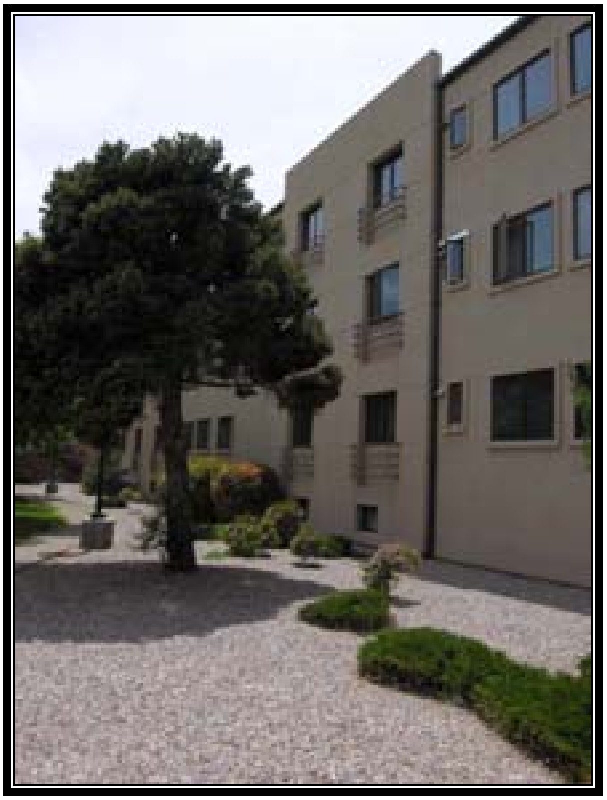


Plate 136 East elevation, Building 22001 (Photograph by RCG&A, 2008)

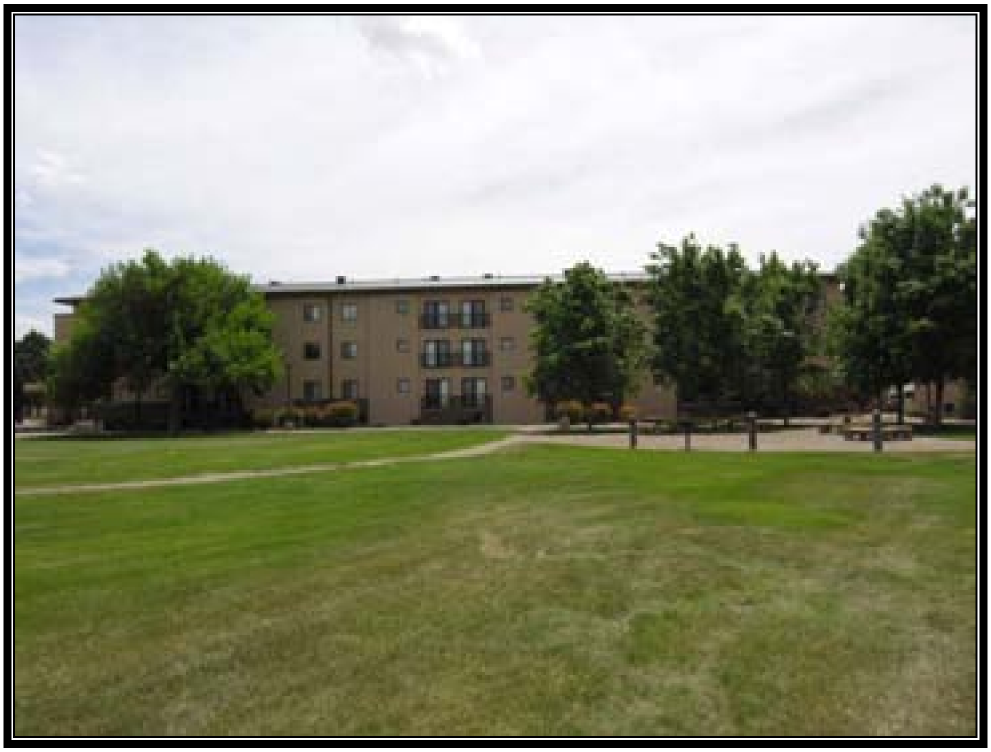


Plate 137 North elevation, Building 22001 (Photograph by RCG&A, 2008)

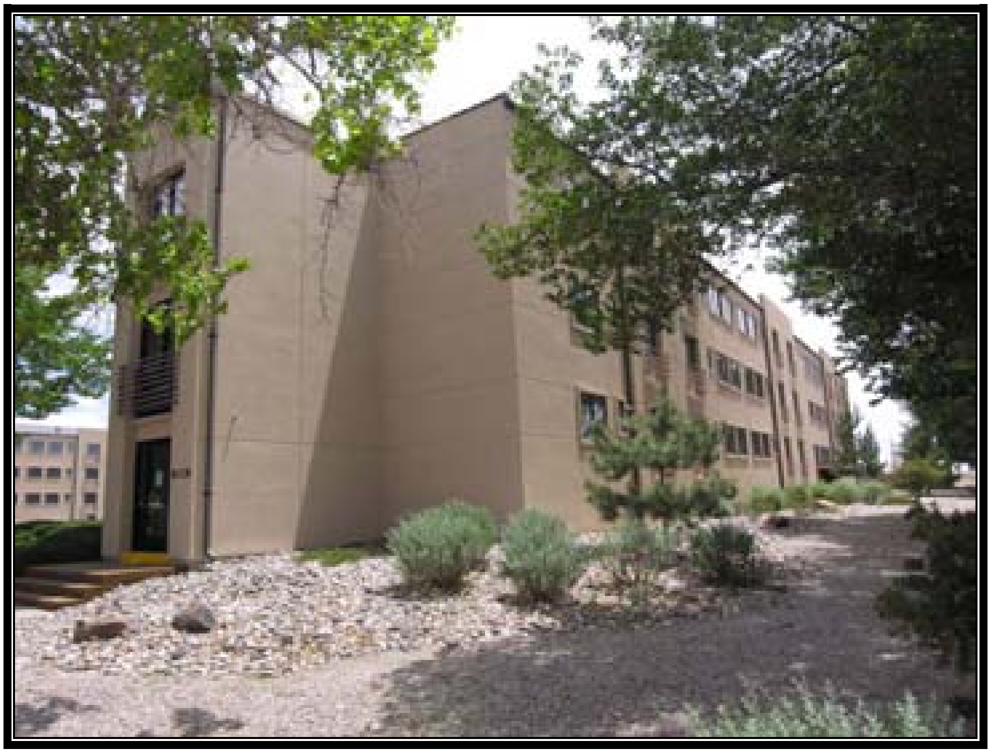


Plate 138 Entry and projecting stair tower on north elevation, Building 22001 (Photograph by RCG&A, 2008)

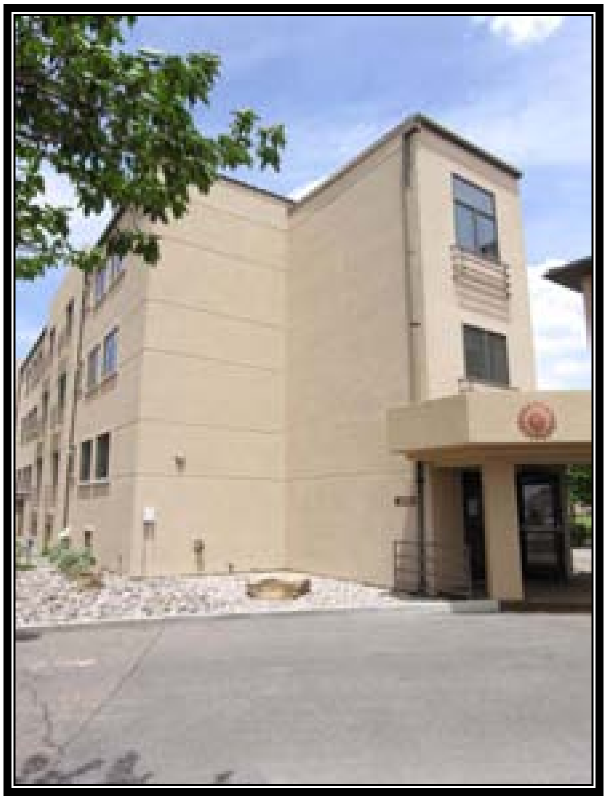


Plate 139 Stair tower and breezeway, Building 22001 (Photograph by RCG&A, 2008)

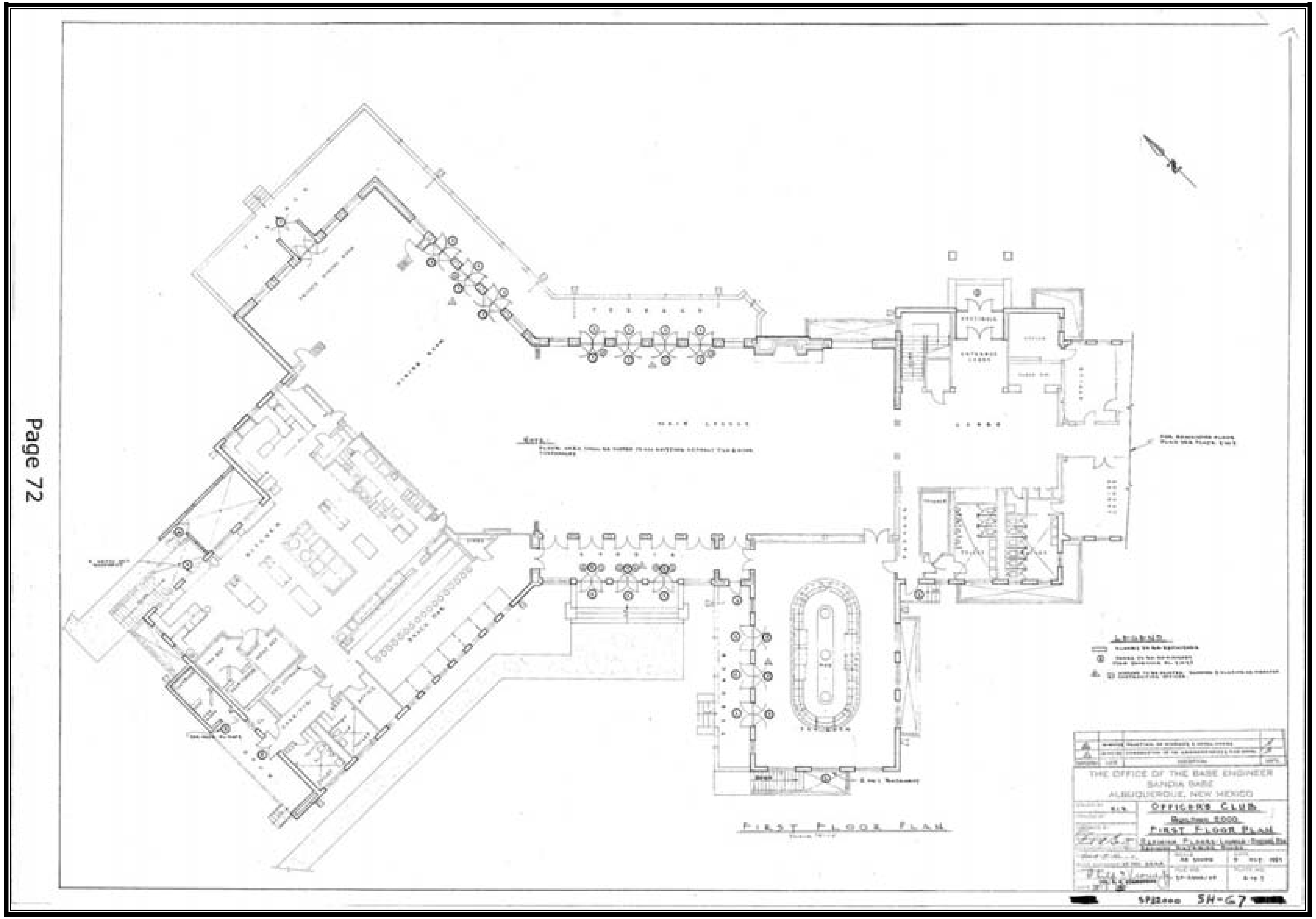


Plate 140 Original floorplan, Building 22000, from drawing completed in 1953 (Courtesy Kirtland Air Force Base)

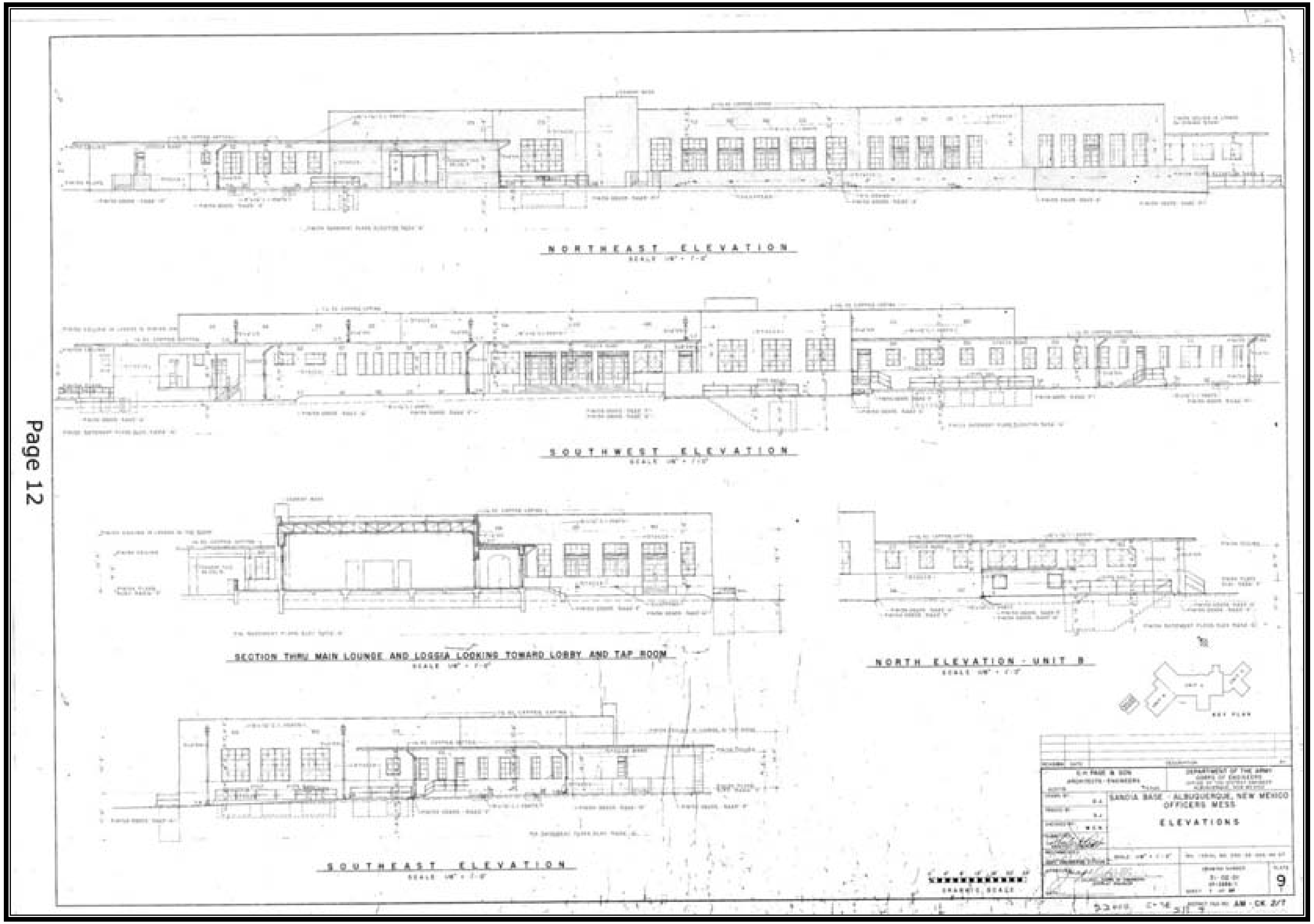


Plate 141 Elevations, Building 22000 (Courtesy Kirtland Air Force Base)

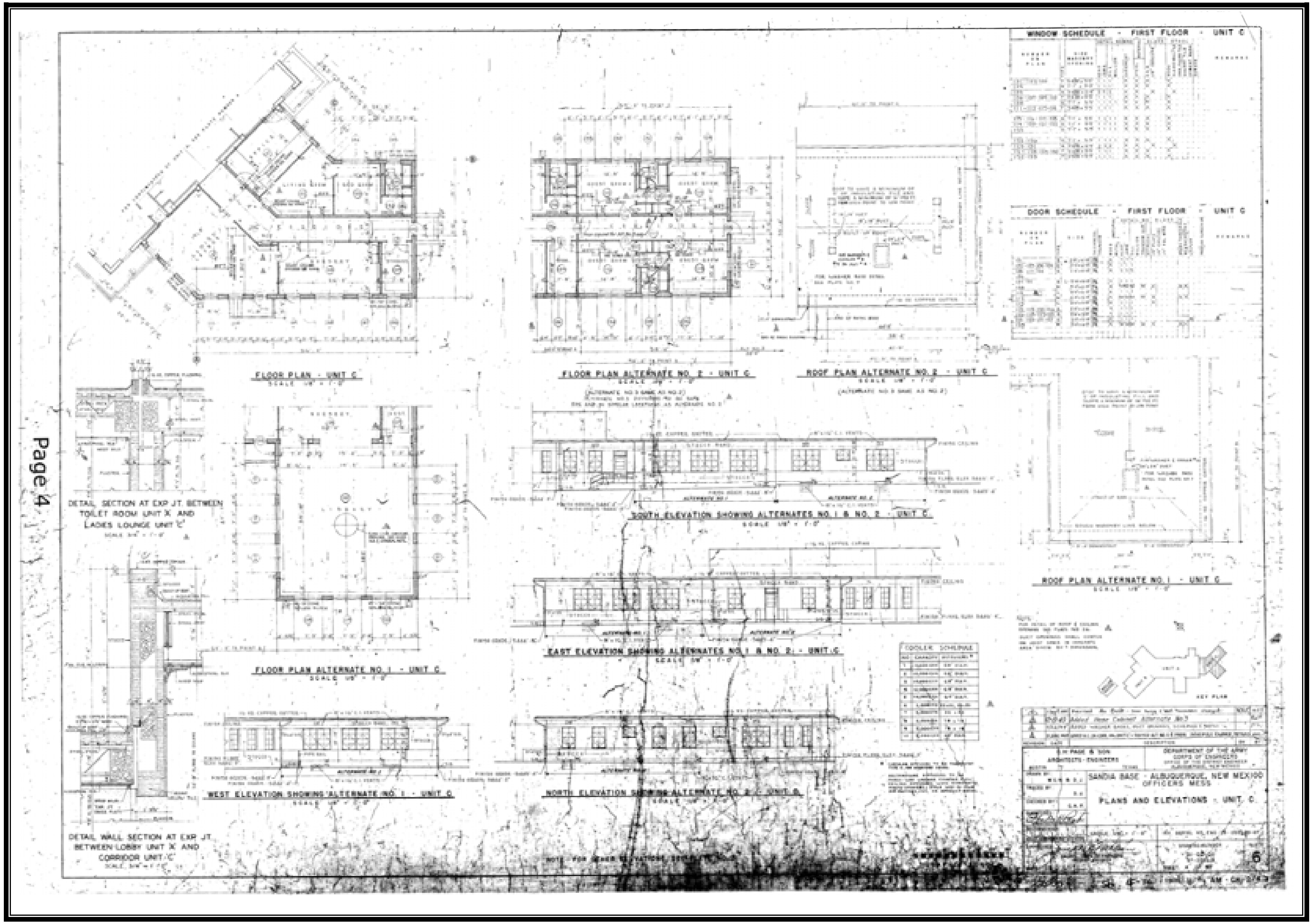

Page 4
WINDOW SCHEDULE - FIRST FLOOR - UNIT C
DOOR SCHEDULE - FIRST FLOOR - UNIT C
FLOOR PLAN - UNIT C
FLOOR PLAN ALTERNATE NO. 2 - UNIT C
ROOF PLAN ALTERNATE NO. 2 - UNIT C
DETAIL SECTION AT EXP JT BETWEEN TOILET ROOM UNIT 'X' AND LADIES LOUNGE UNIT 'C'
SOUTH ELEVATION SHOWING ALTERNATES NO. 1 & NO. 2 - UNIT C
ROOF PLAN ALTERNATE NO. 1 - UNIT C
FLOOR PLAN ALTERNATE NO. 1 - UNIT C
EAST ELEVATION SHOWING ALTERNATES NO. 1 & NO. 2 - UNIT C
COOLER SCHEDULE
KEY PLAN
WEST ELEVATION SHOWING ALTERNATE NO. 1 - UNIT C
NORTH ELEVATION SHOWING ALTERNATE NO. 2 - UNIT C
DETAIL WALL SECTION AT EXP JT BETWEEN LOBBY UNIT 'X' AND CORRIDOR UNIT 'C'
C.H. PAGE & SON ARCHITECTS - ENGINEERS
DEPARTMENT OF THE ARMY CORPS OF ENGINEERS
SANDIA BASE - ALBUQUERQUE, NEW MEXICO
OFFICERS MESS
PLANS AND ELEVATIONS - UNIT C

Plate 142 Partial elevations and alternate floorplans, Building 22000, from as-built drawings completed in 1950 (Courtesy Kirtland Air Force Base)

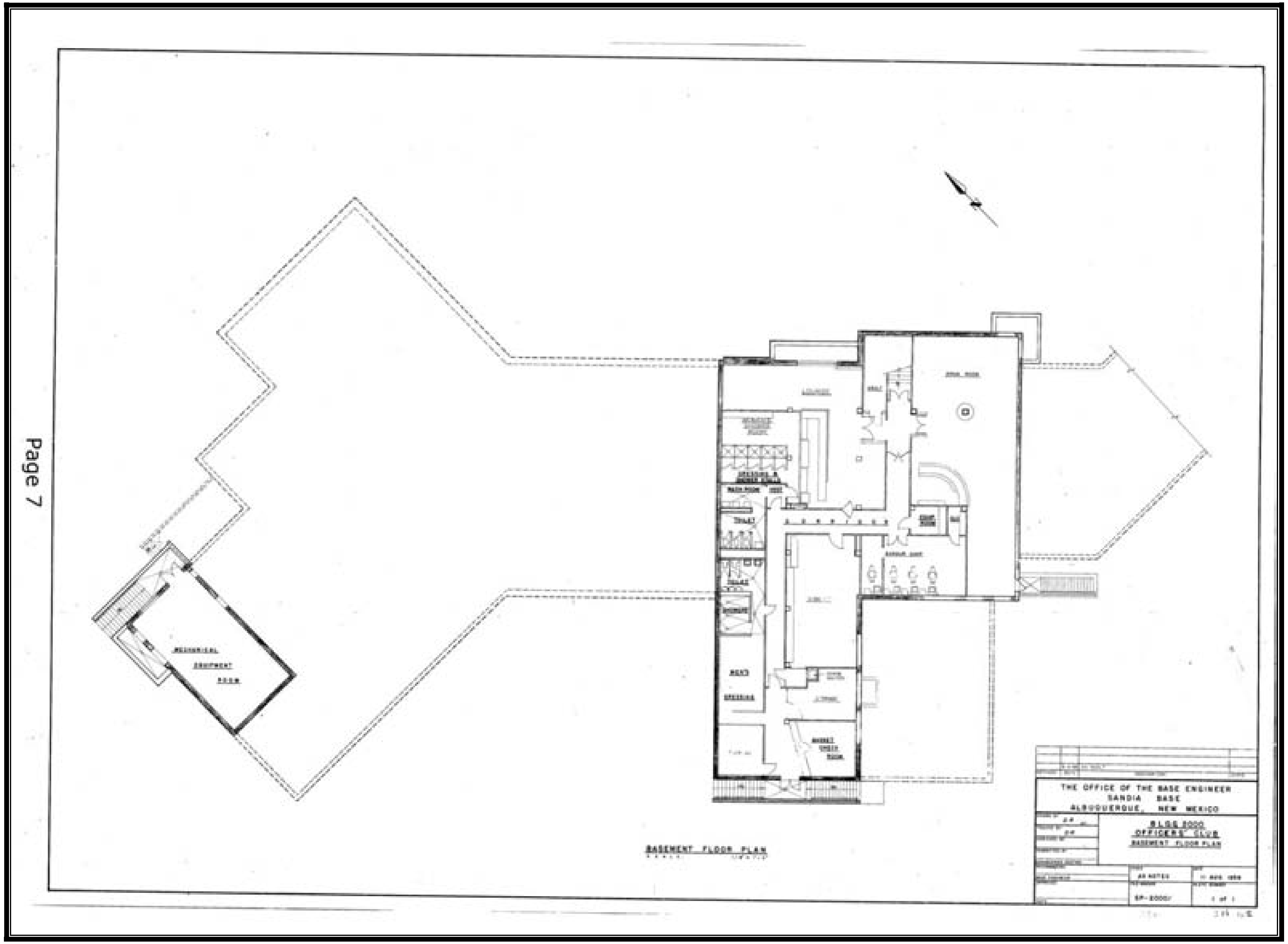


Plate 143 Basement renovations for Building 22000 from drawings completed in 1959 (Courtesy Kirtland Air Force Base)

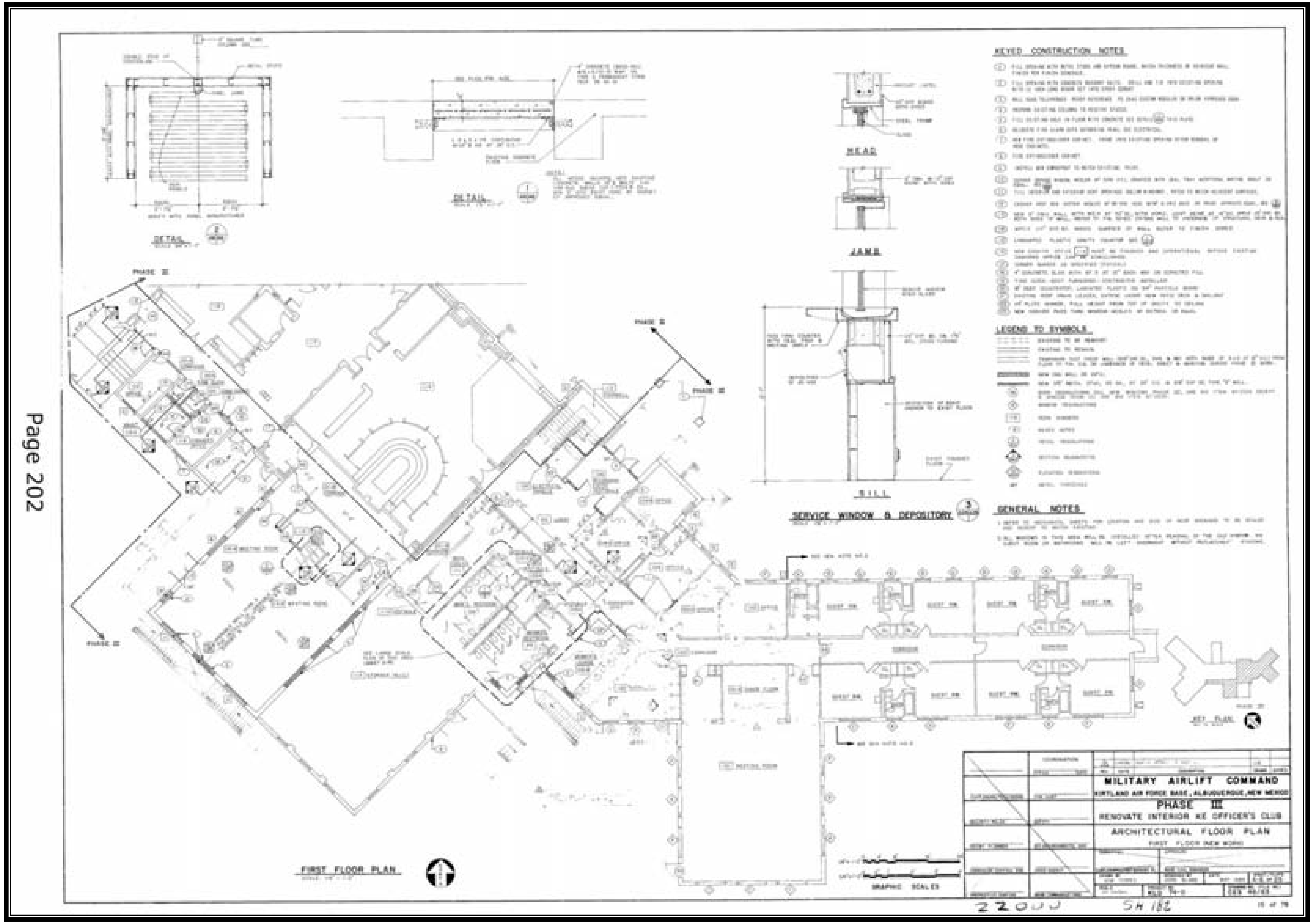


Plate 144 Partial floorplan showing renovations to Building 22000 from drawings completed in 1984 (Courtesy Kirtland Air Force Base)

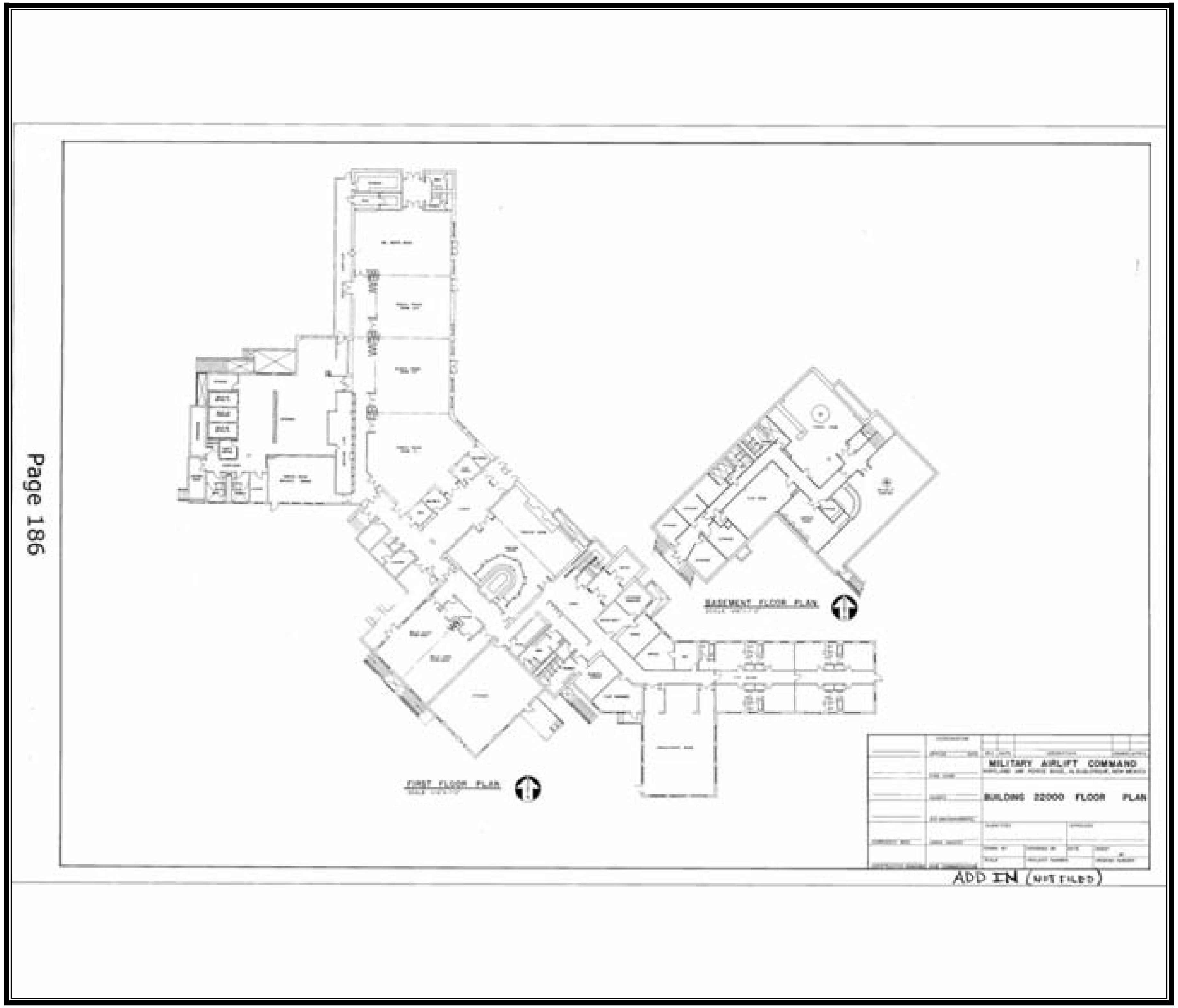


Plate 145 Current floorplan, Building 22000 (Courtesy Kirtland Air Force Base)

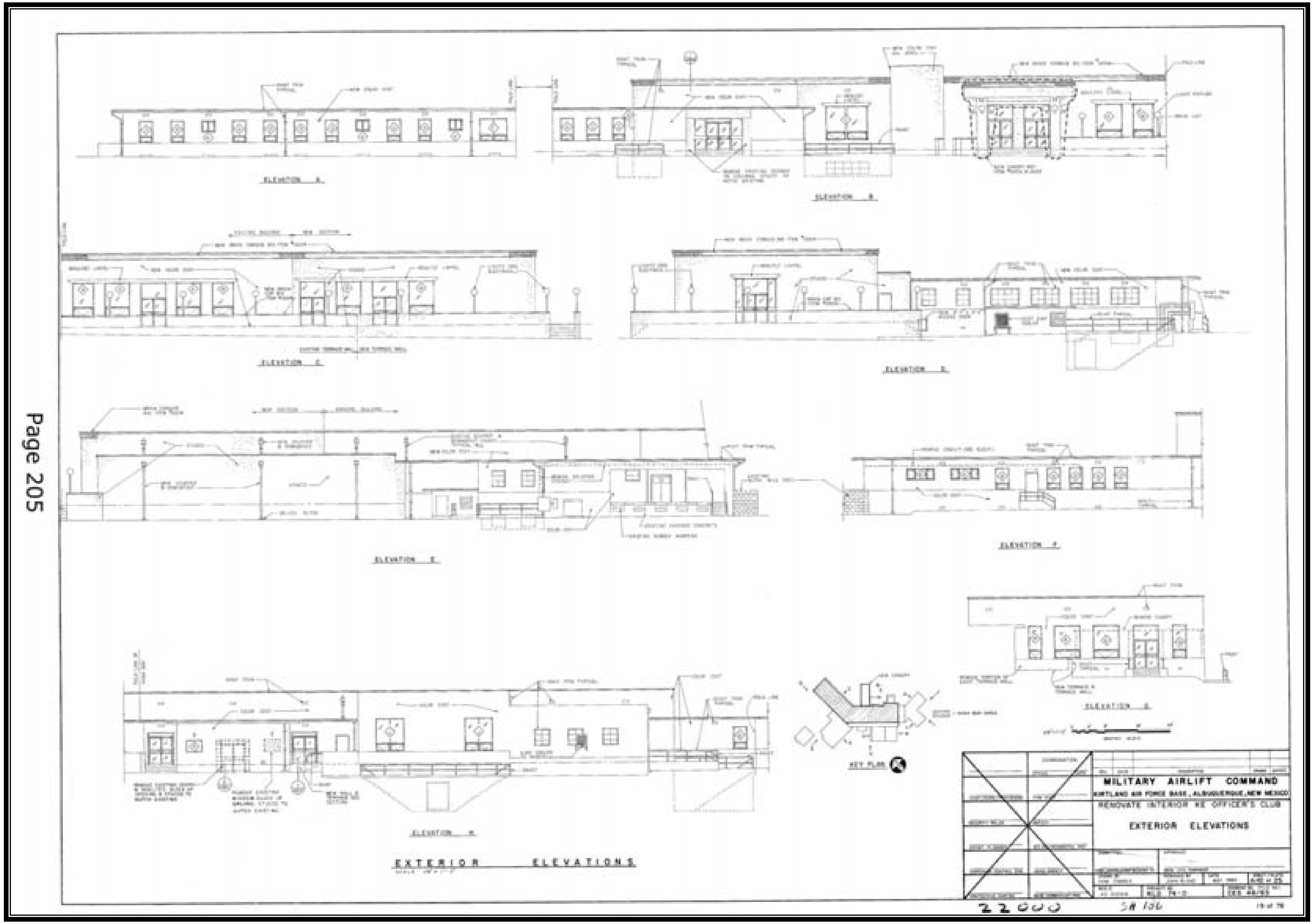


Plate 146 Current elevations of Building 22000 (Courtesy Kirtland Air Force Base)

Plate 147 View of Building 22000 looking southwest (Photograph by RCG&A, 2008)

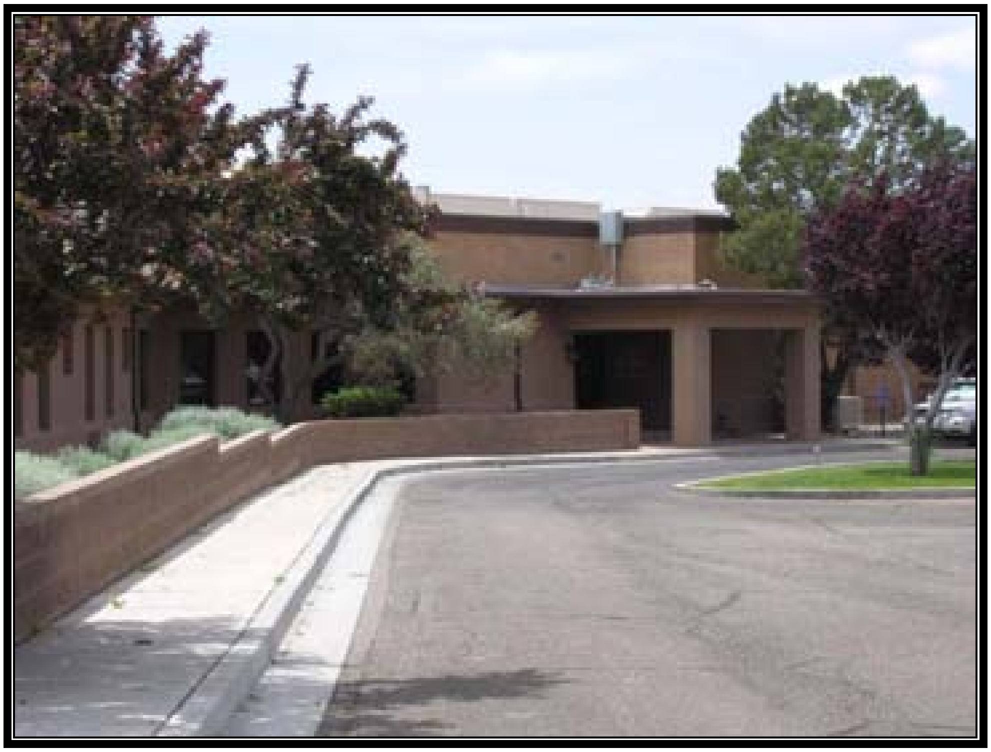


Plate 148 Entry canopy of Building 22000 (Photograph by RCG&A, 2008)

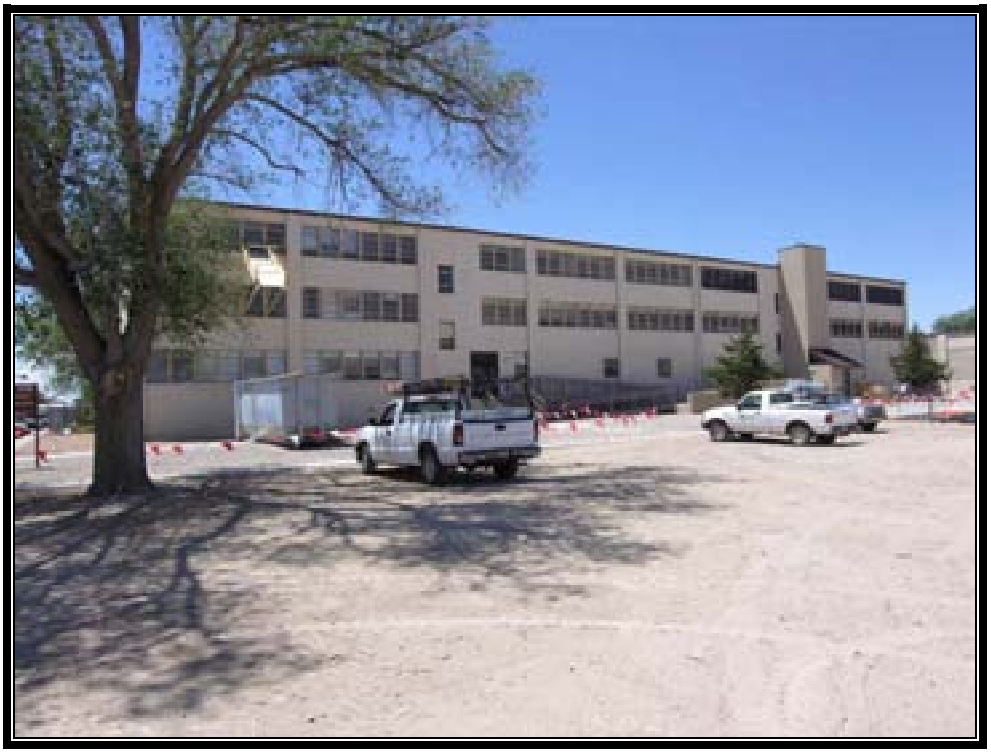


Plate 149 Building 20361, east elevation (Photograph by RCG&A, 2008)

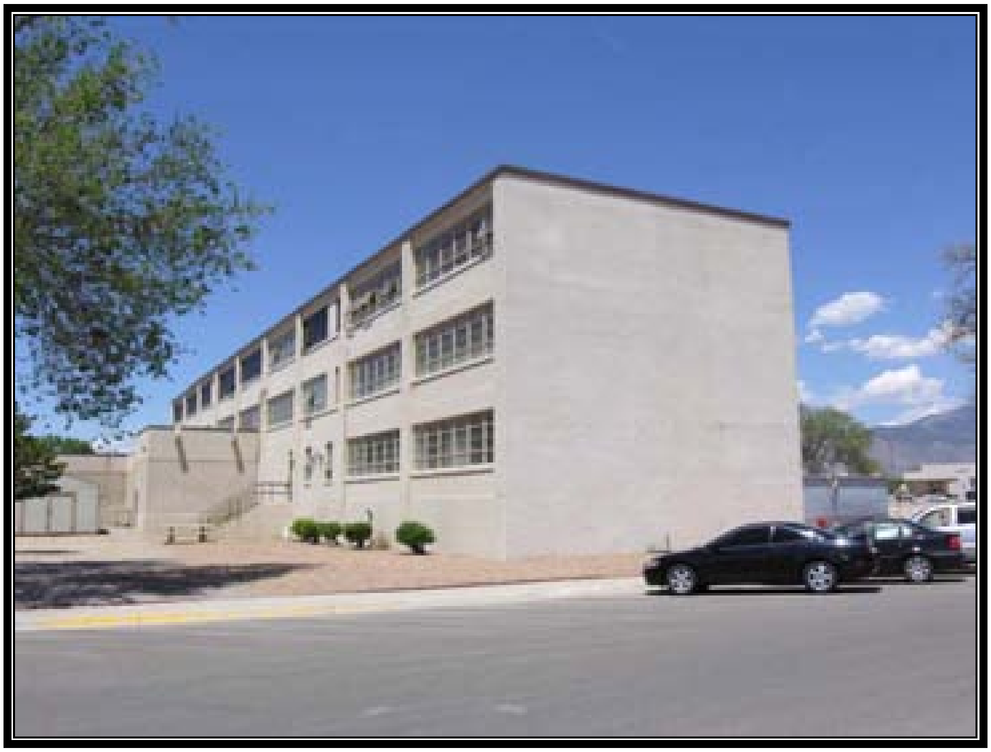


Plate 150 Building 20361, west elevation (Photograph by RCG&A, 2008)

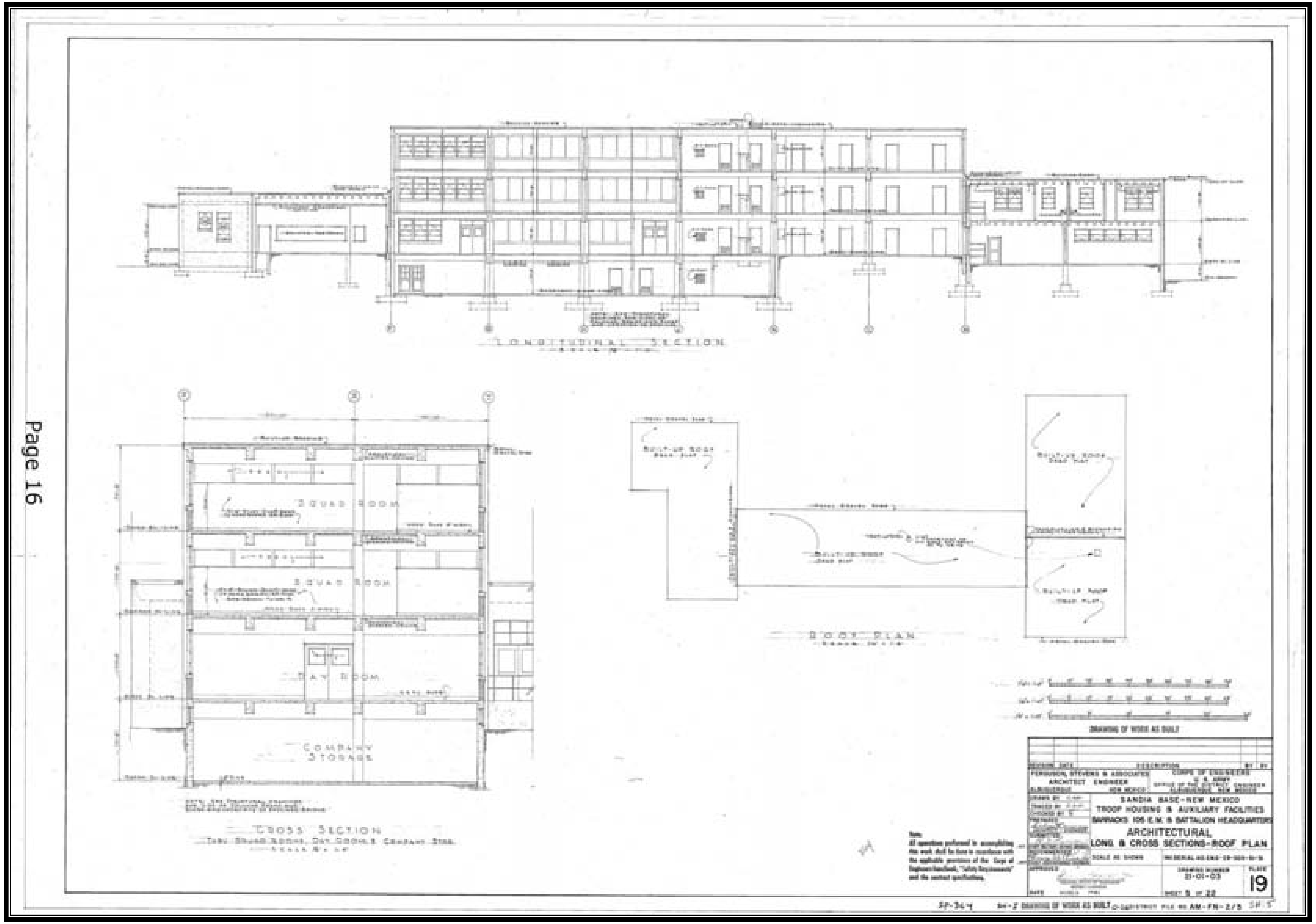


Plate 151 Sections for Building 20364 completed in 1951 (Courtesy Kirtland Air Force Base)

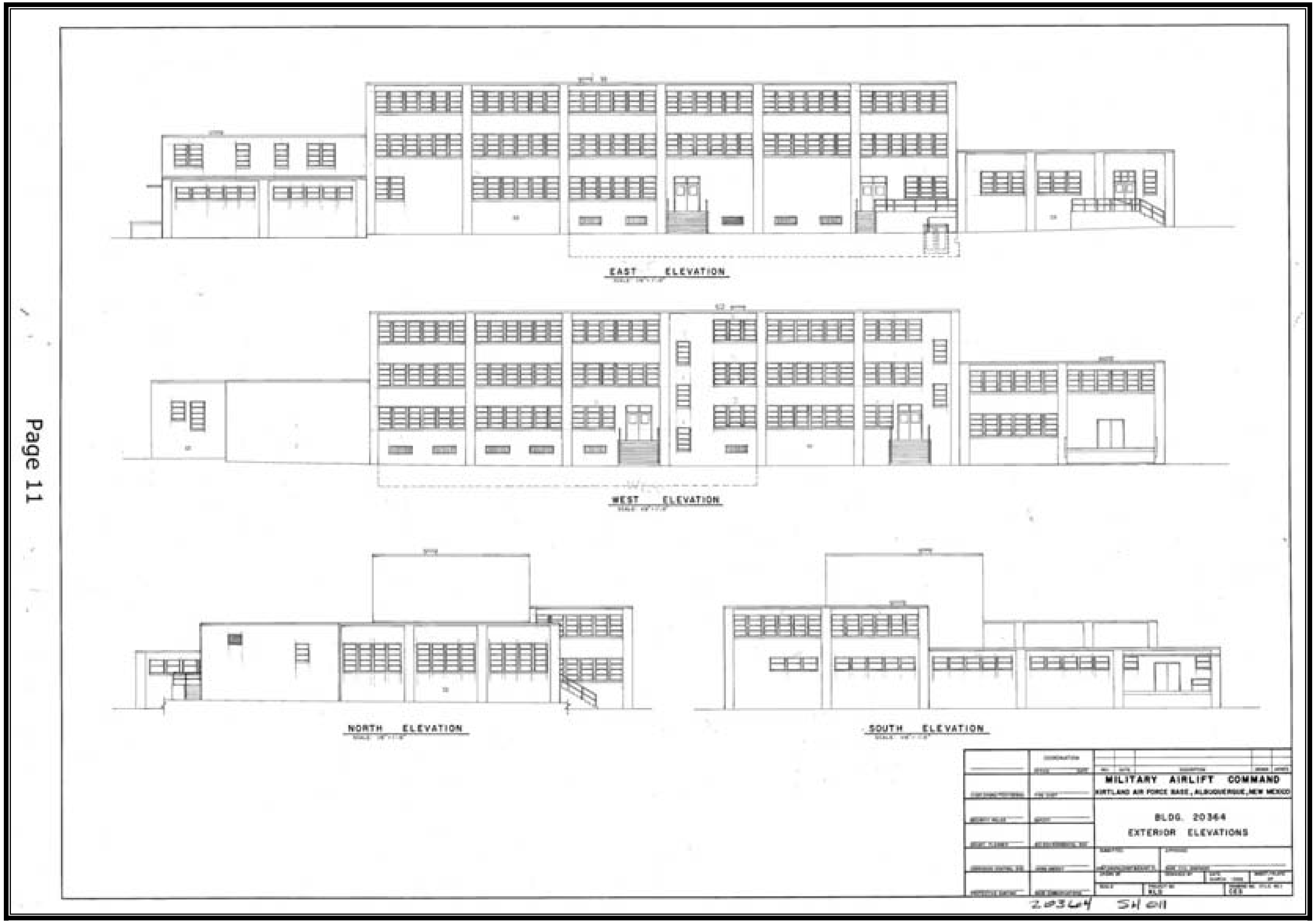


Plate 152 Elevations of Building 20364 completed in 1988 (Courtesy Kirtland Air Force Base)

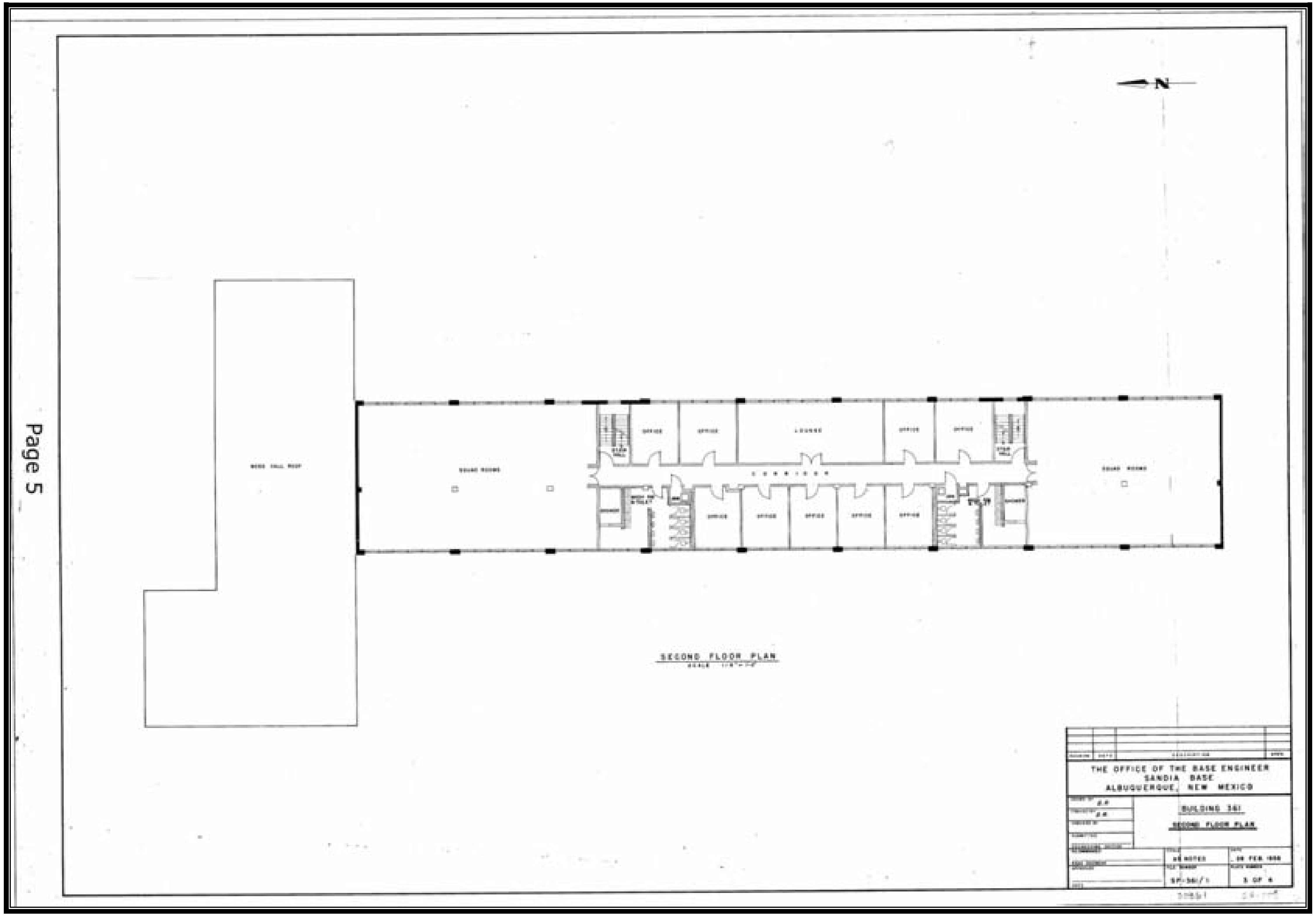


Plate 153 Floorplans of Building 20361 completed in 1958 (Courtesy Kirtland Air Force Base)

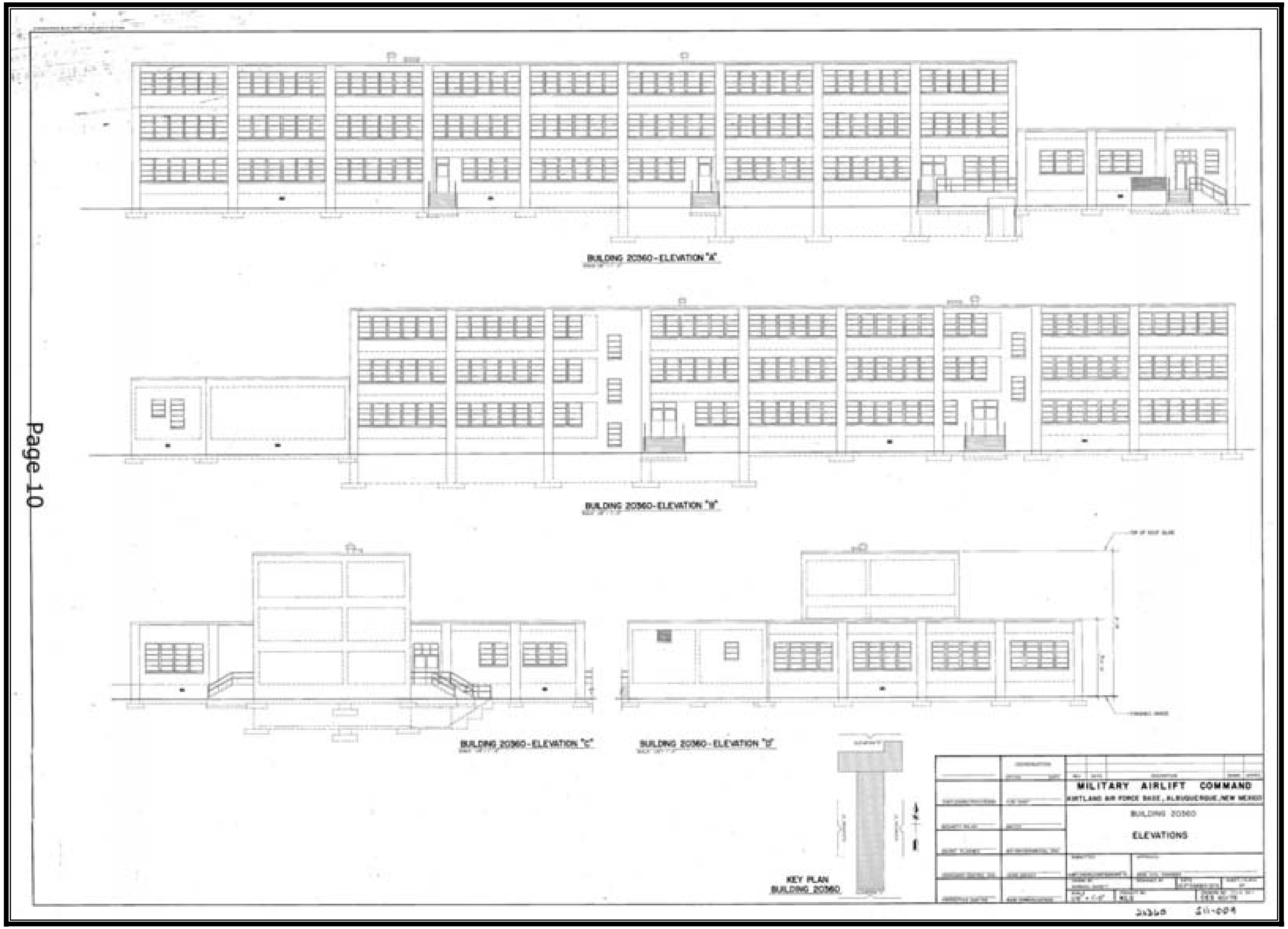

BUILDING 20360 - ELEVATION "A"
BUILDING 20360 - ELEVATION "B"
BUILDING 20360 - ELEVATION "C"
BUILDING 20360 - ELEVATION "D"
Page 10
KEY PLAN
BUILDING 20360
MILITARY AIRLIFT COMMAND
KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO
BUILDING 20360
ELEVATIONS
20360
211-004

Plate 154 Elevations of Building 20360 completed in 1978 (Courtesy Kirtland Air Force Base)

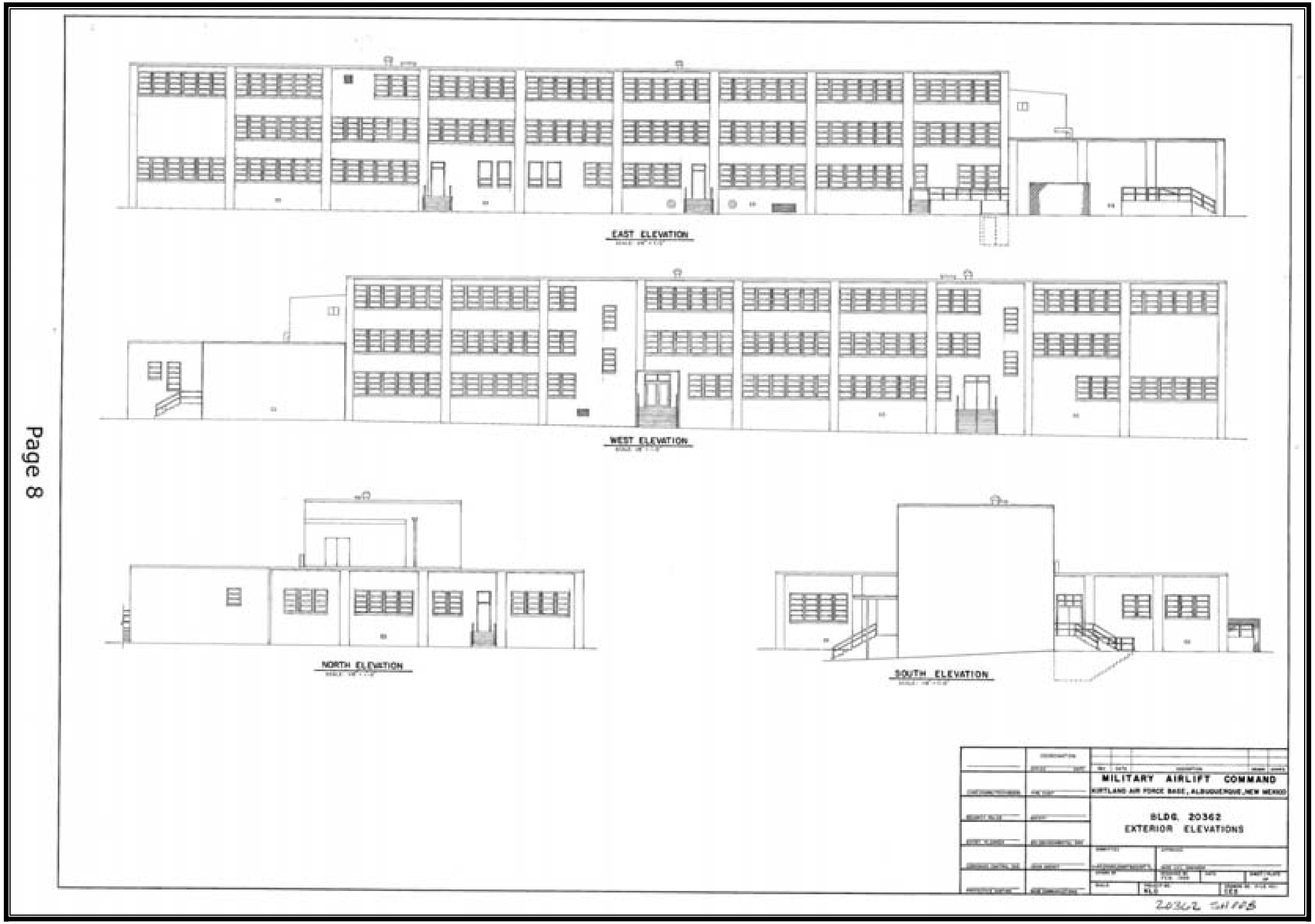


Plate 155 Elevations of Building 20362 completed in 1988 (Courtesy Kirtland Air Force Base)

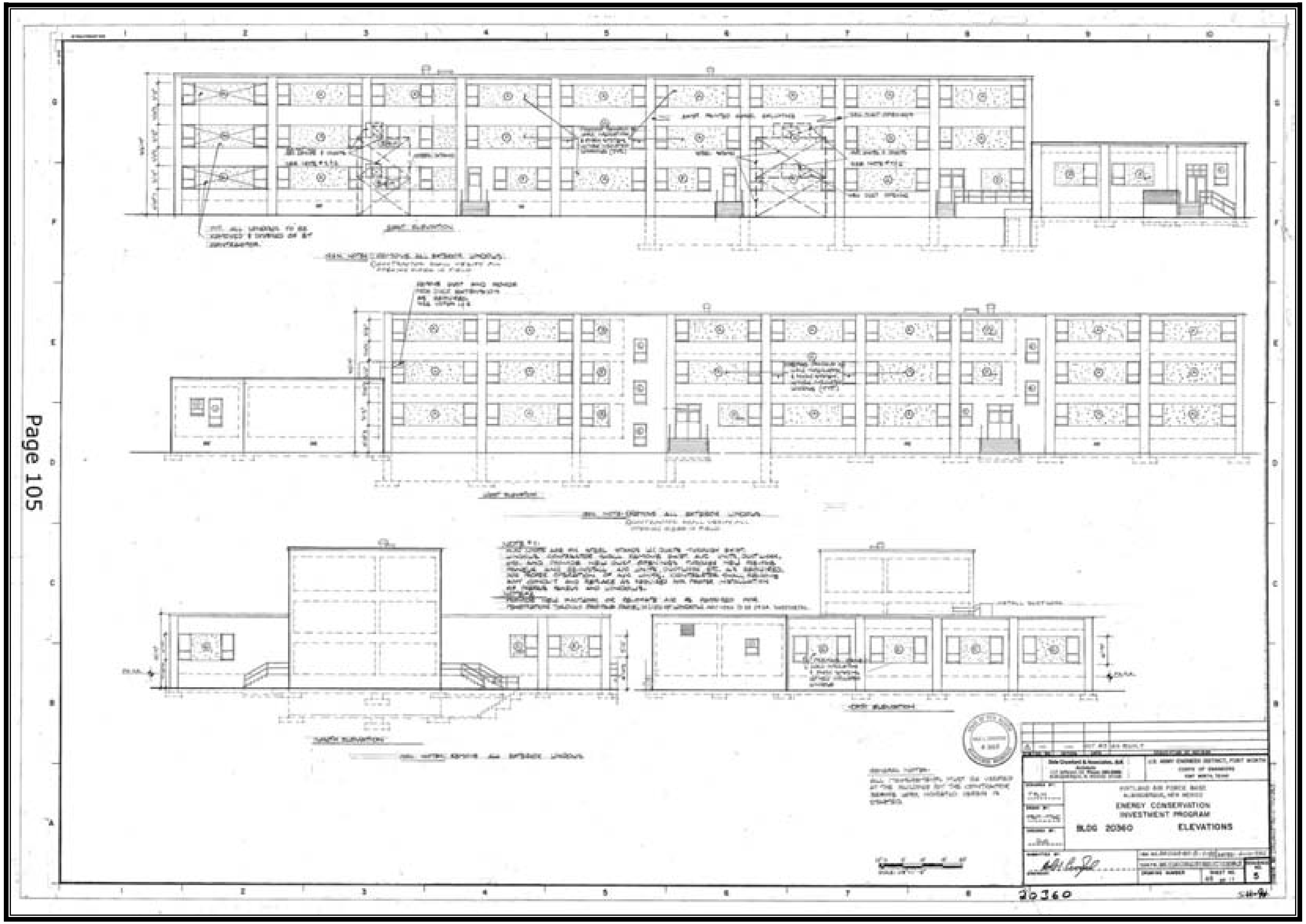


Plate 156 Modifications to Building 20360 from drawings completed in 1982 (Courtesy Kirtland Air Force Base)

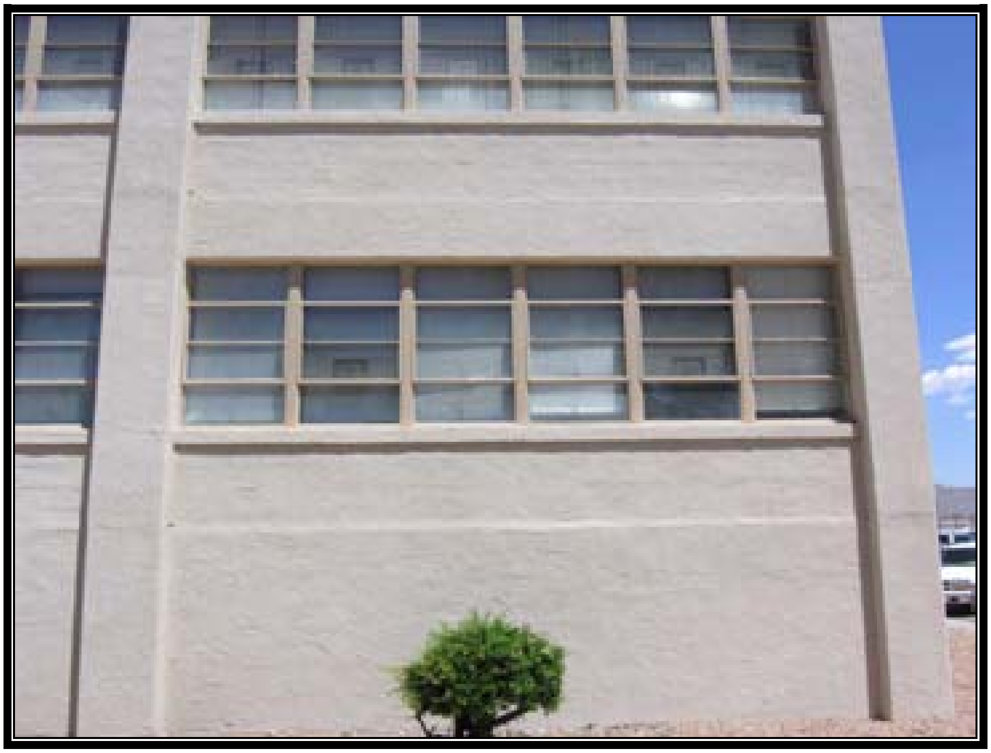


Plate 157 Window detail, Building 20361 (Photograph by RCG&A, 2008)

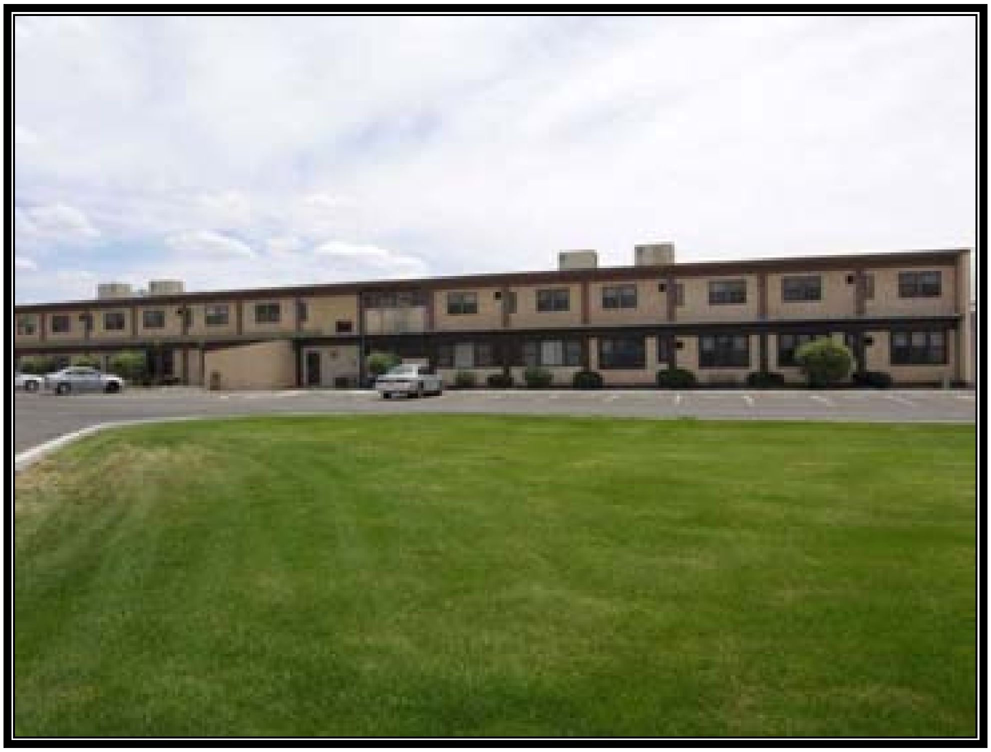


Plate 158 Building 22010, north elevation (Photograph by RCG&A, 2008)

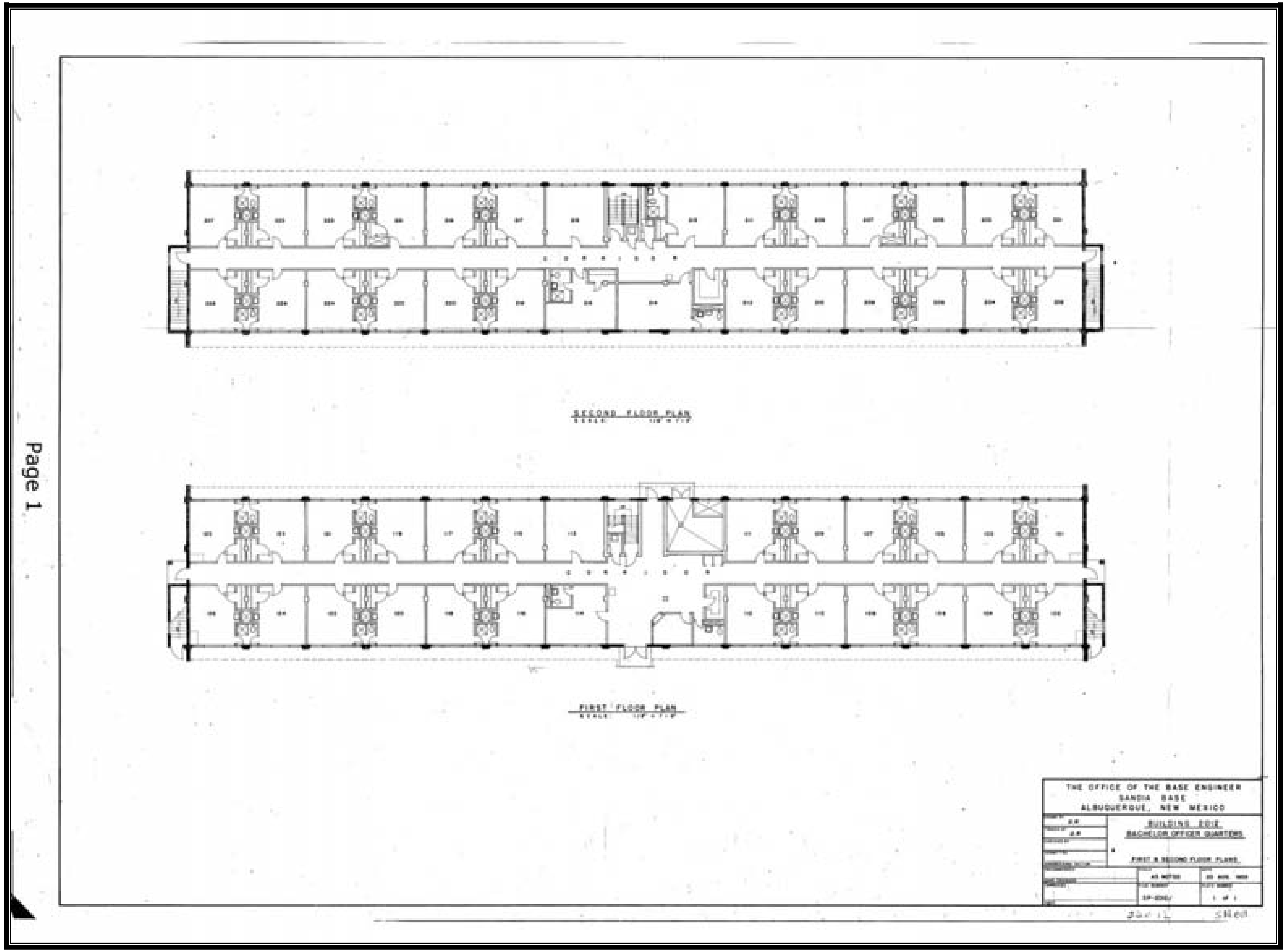


Plate 159 Floor plans of Building 22012 developed in 1959 (Courtesy Kirtland Air Force Base)

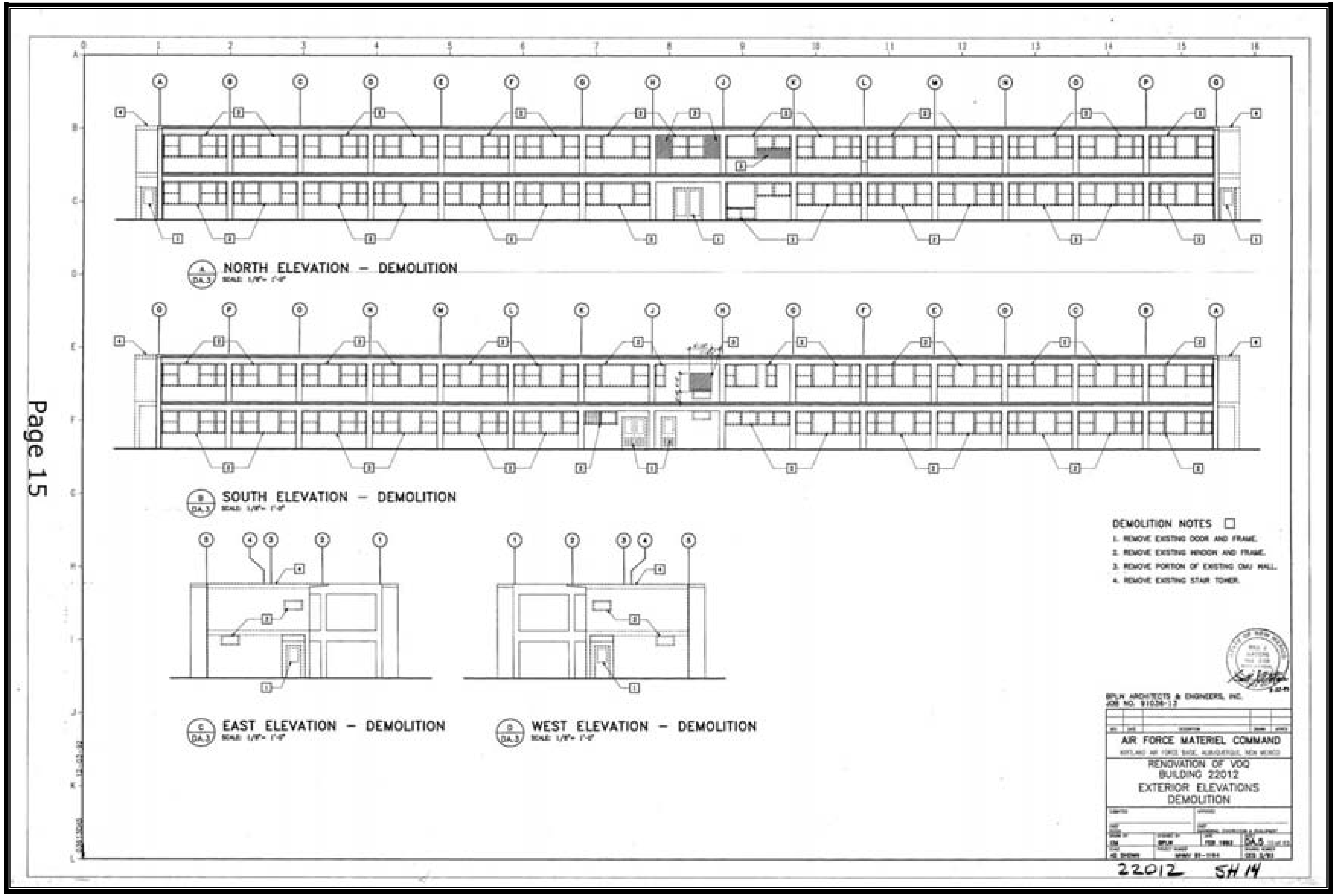

NORTH ELEVATION – DEMOLITION
SCALE: 1/8" = 1'-0"
SOUTH ELEVATION – DEMOLITION
SCALE: 1/8" = 1'-0"
EAST ELEVATION – DEMOLITION
SCALE: 1/8" = 1'-0"
WEST ELEVATION – DEMOLITION
SCALE: 1/8" = 1'-0"
DEMOLITION NOTES ☐
1. REMOVE EXISTING DOOR AND FRAME.
2. REMOVE EXISTING WINDOW AND FRAME.
3. REMOVE PORTION OF EXISTING CMU WALL.
4. REMOVE EXISTING STAIR TOWER.
BPLW ARCHITECTS & ENGINEERS, INC.
AIR FORCE MATERIEL COMMAND
KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO
RENOVATION OF VOQ
BUILDING 22012
EXTERIOR ELEVATIONS
DEMOLITION
FEB 1993
DA.3
22012 SH 14
Page 15

Plate 160 Existing conditions of Building 22012 in 1993 (Courtesy Kirtland Air Force Base)

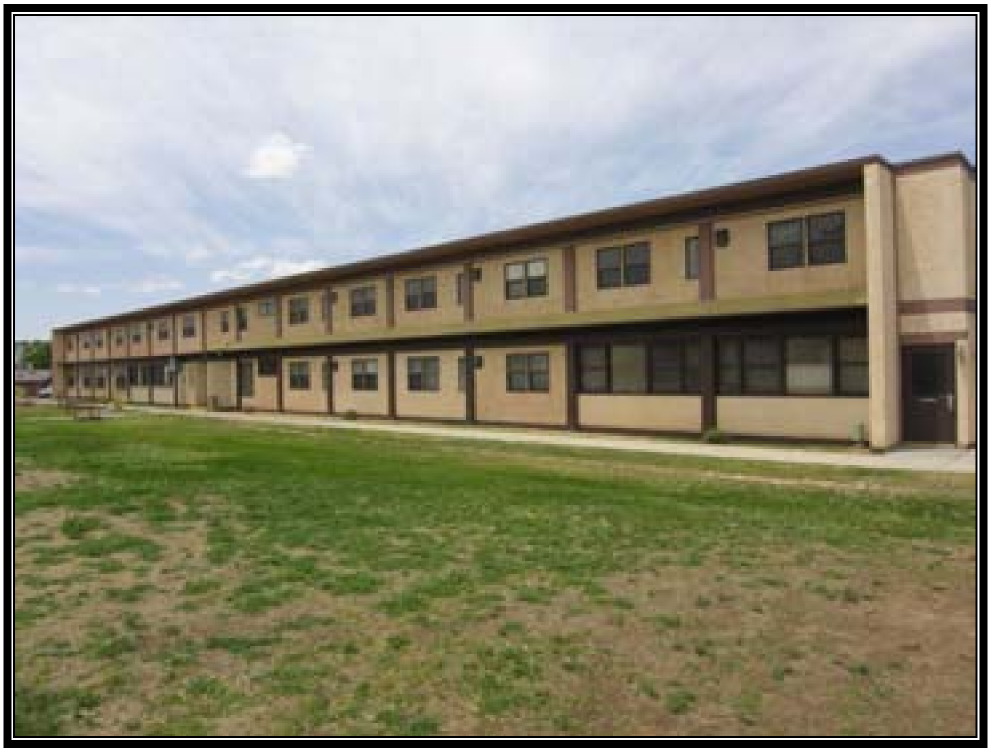


Plate 161 Building 22010, south elevation (Photograph by RCG&A, 2008)

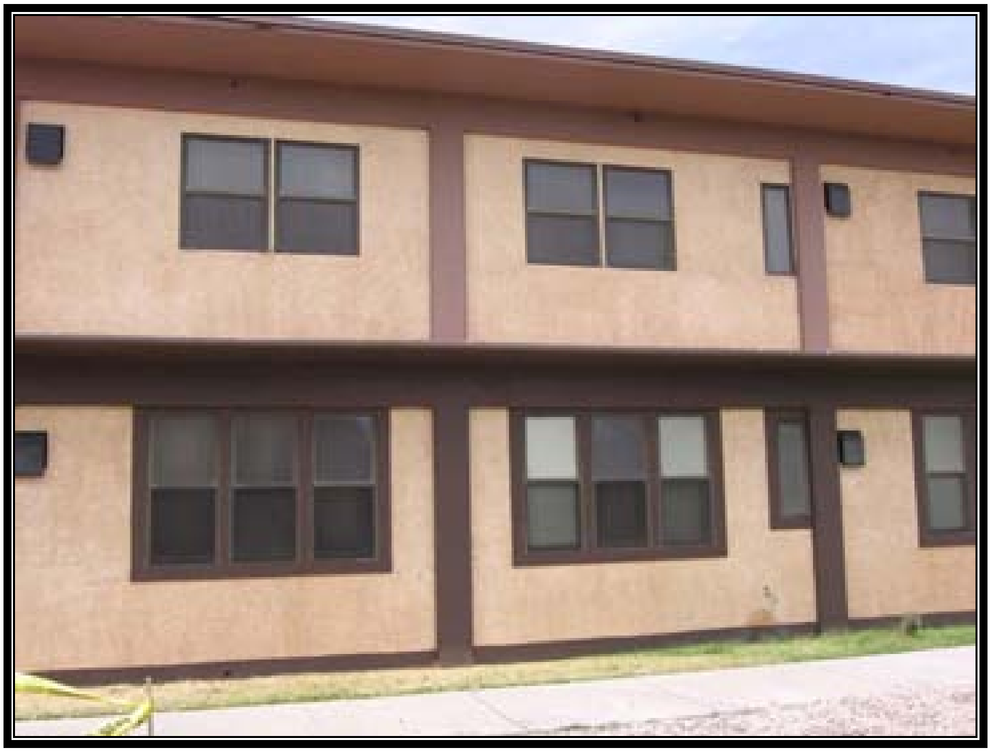


Plate 162 Detail of wall structure, Building 22010 (Photograph by RCG&A, 2008)

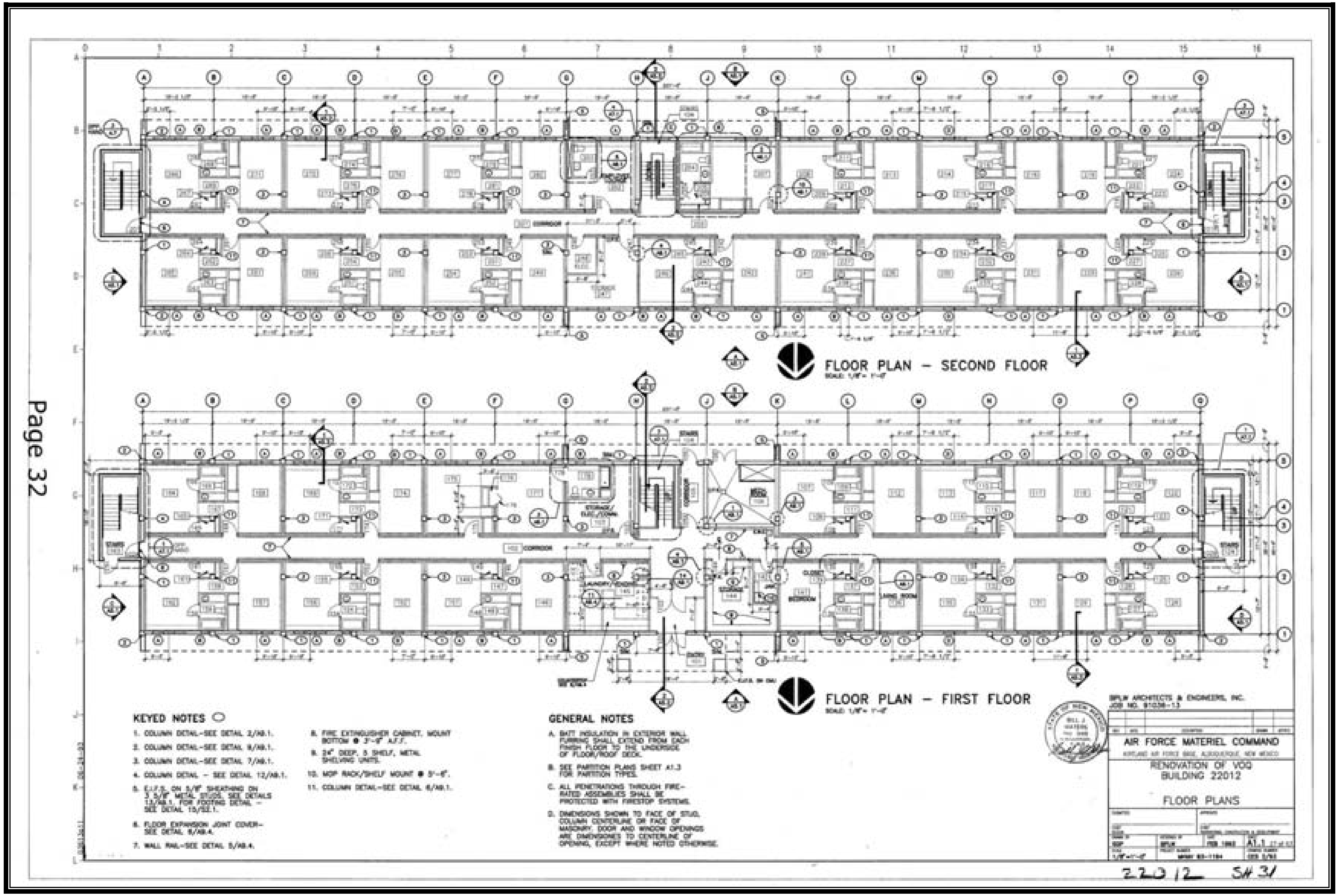

Page 32
FLOOR PLAN – SECOND FLOOR
SCALE: 1/8" = 1'-0"
CORRIDOR
FLOOR PLAN – FIRST FLOOR
SCALE: 1/8" = 1'-0"
STORAGE/ELEC./COMM.
LAUNDRY/VENDING
CLOSET
BEDROOM
LIVING ROOM
KEYED NOTES
1. COLUMN DETAIL–SEE DETAIL 2/A8.1.
2. COLUMN DETAIL–SEE DETAIL 8/A8.1.
3. COLUMN DETAIL–SEE DETAIL 7/A8.1.
4. COLUMN DETAIL – SEE DETAIL 12/A8.1.
5. E.I.F.S. ON 5/8" SHEATHING ON 3 5/8" METAL STUDS. SEE DETAILS 13/A8.1. FOR FOOTING DETAIL – SEE DETAIL 15/S2.1.
6. FLOOR EXPANSION JOINT COVER– SEE DETAIL 6/A8.4.
7. WALL RAIL–SEE DETAIL 5/A8.4.
8. FIRE EXTINGUISHER CABINET. MOUNT BOTTOM @ 3'-9" A.F.F.
9. 24" DEEP, 5 SHELF, METAL SHELVING UNITS.
10. MOP RACK/SHELF MOUNT @ 5'-6".
11. COLUMN DETAIL–SEE DETAIL 6/A8.1.
GENERAL NOTES
A. BATT INSULATION IN EXTERIOR WALL FURRING SHALL EXTEND FROM EACH FINISH FLOOR TO THE UNDERSIDE OF FLOOR/ROOF DECK.
B. SEE PARTITION PLANS SHEET A1.3 FOR PARTITION TYPES.
C. ALL PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES SHALL BE PROTECTED WITH FIRESTOP SYSTEMS.
D. DIMENSIONS SHOWN TO FACE OF STUD, COLUMN CENTERLINE OR FACE OF MASONRY. DOOR AND WINDOW OPENINGS ARE DIMENSIONED TO CENTERLINE OF OPENING, EXCEPT WHERE NOTED OTHERWISE.
BPLW ARCHITECTS & ENGINEERS, INC.
AIR FORCE MATERIEL COMMAND
KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO
RENOVATION OF VOQ
BUILDING 22012
FLOOR PLANS
FEB 1993
A1.1
22012 SH 31

Plate 163 Floor plans of Building 22012 developed in 1993 (Courtesy Kirtland Air Force Base)

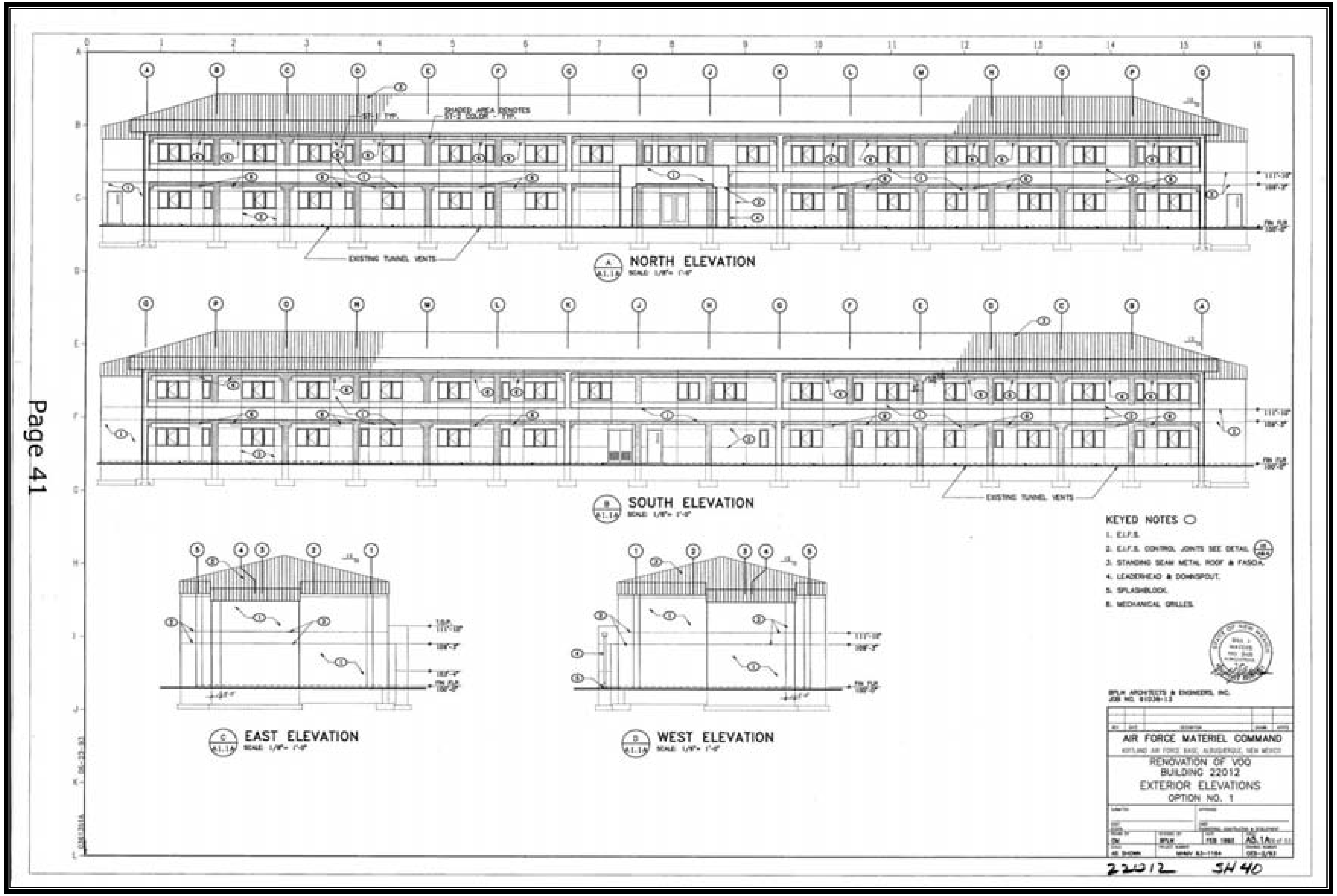


Plate 164 Elevation drawings of Building 22012 developed in 1993 (Courtesy Kirtland Air Force Base)

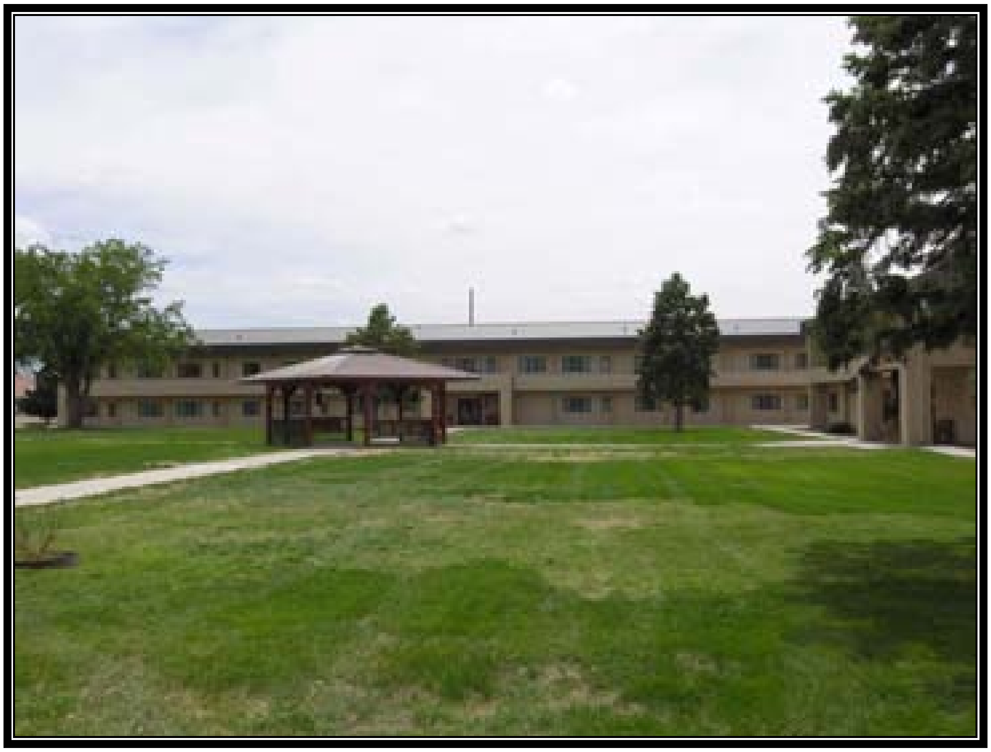


Plate 165 North elevation, Building 22012 (Photograph by RCG&A, 2008)

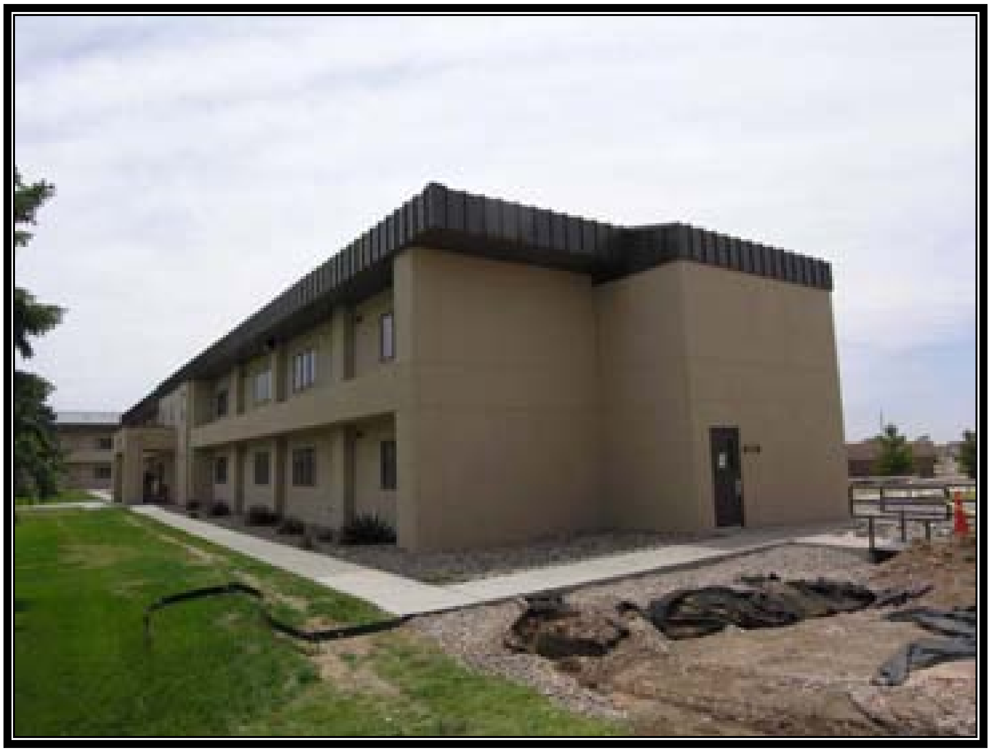


Plate 166 View of Building 22011, looking southwest (Photograph by RCG&A, 2008)

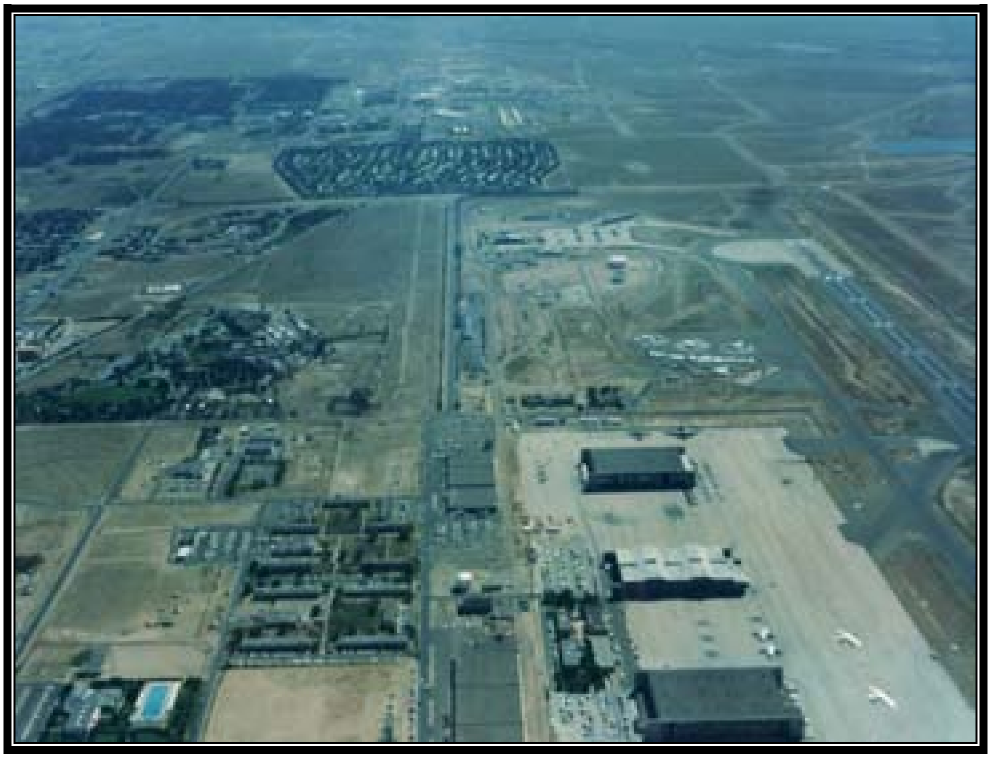


Plate 167 Aerial view of Kirtland Air Force Base taken in 1973. Dormitories in the 900 area at lower, left center (Courtesy Kirtland Air Force Base)

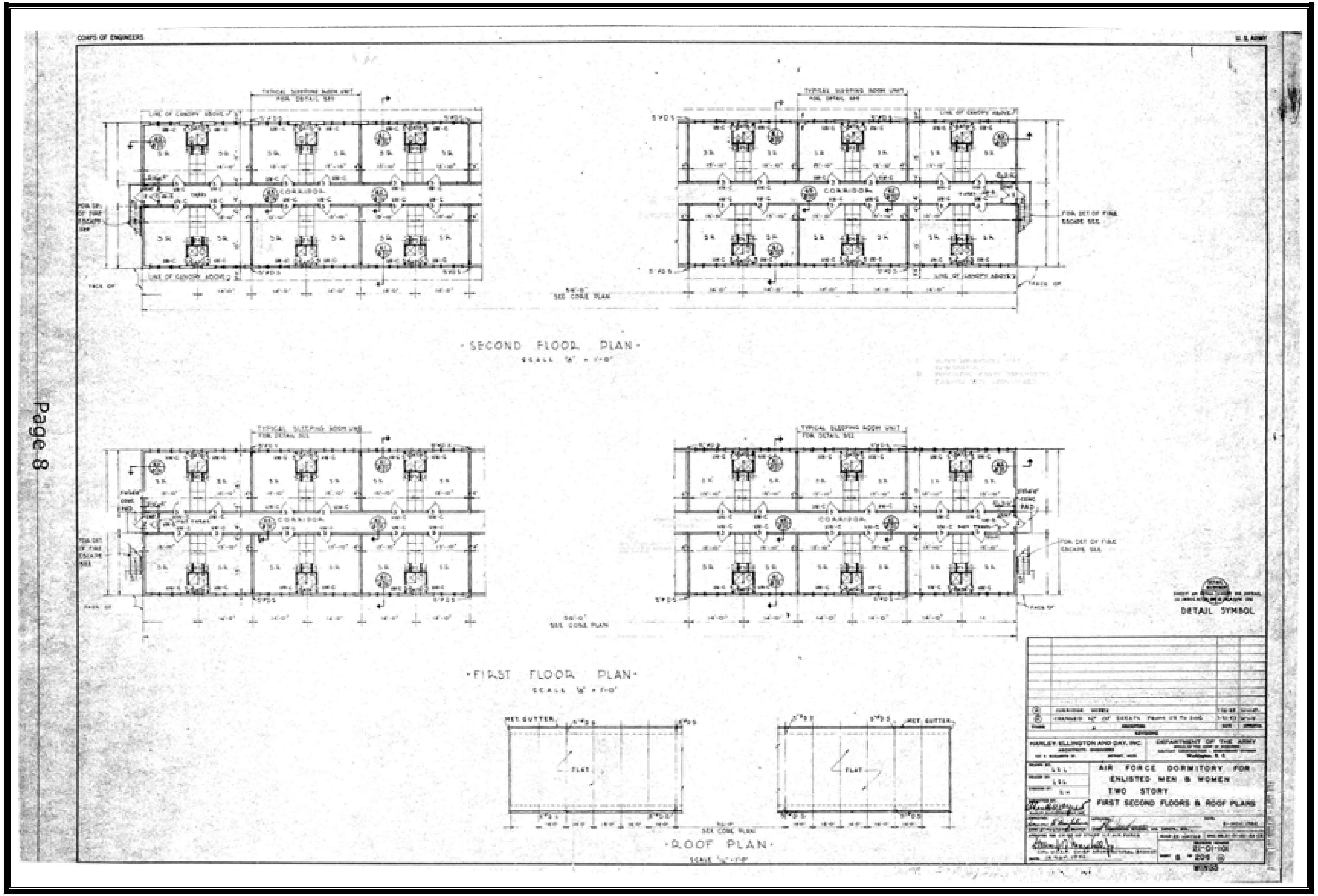


Plate 168 Partial floorplan, drawn in 1952, showing room arrangement (Courtesy Kirtland Air Force Base)

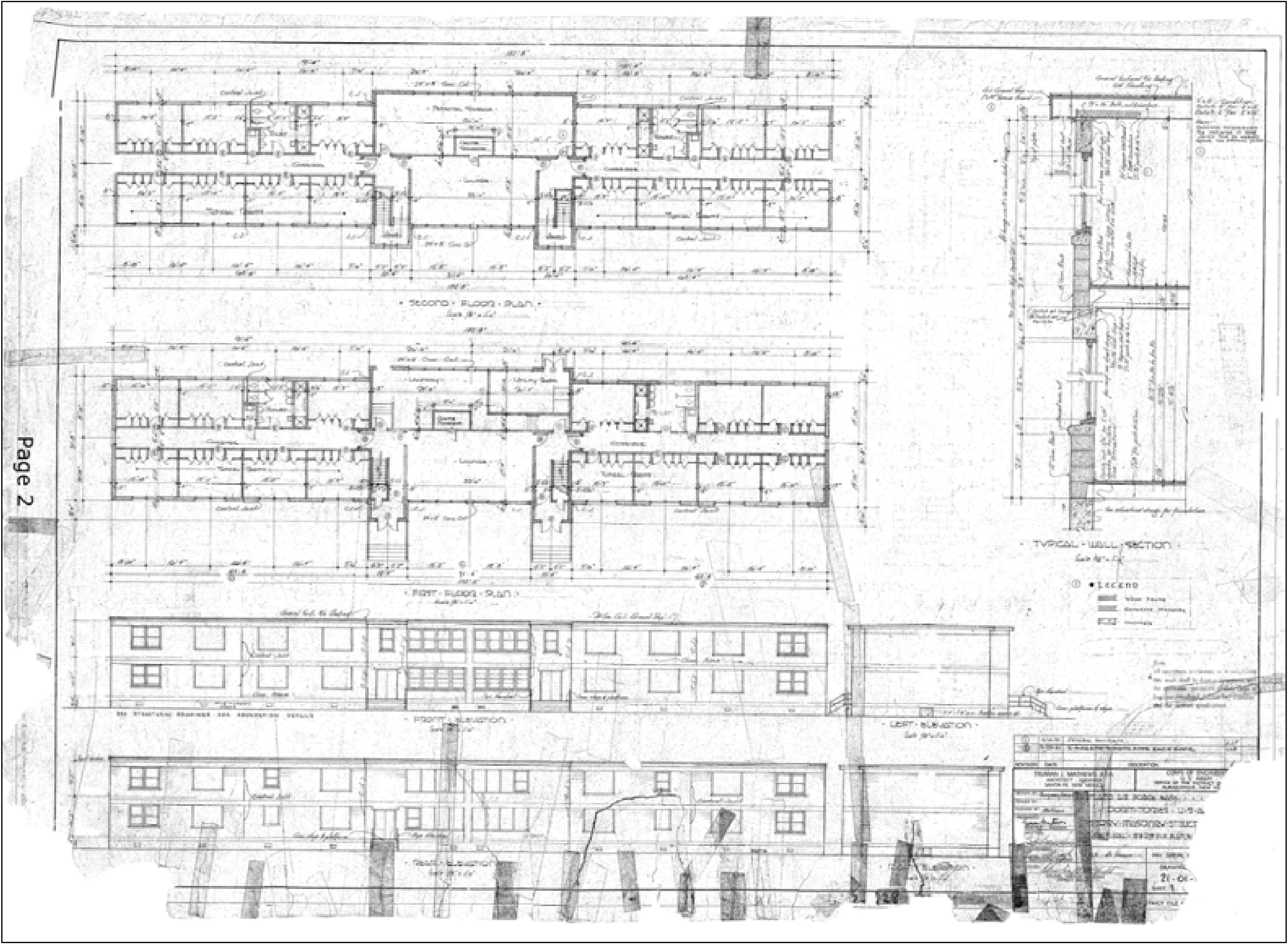


Plate 169 Typical “I Type” dormitory from plans developed in 1951 (Courtesy Kirtland Air Force Base)

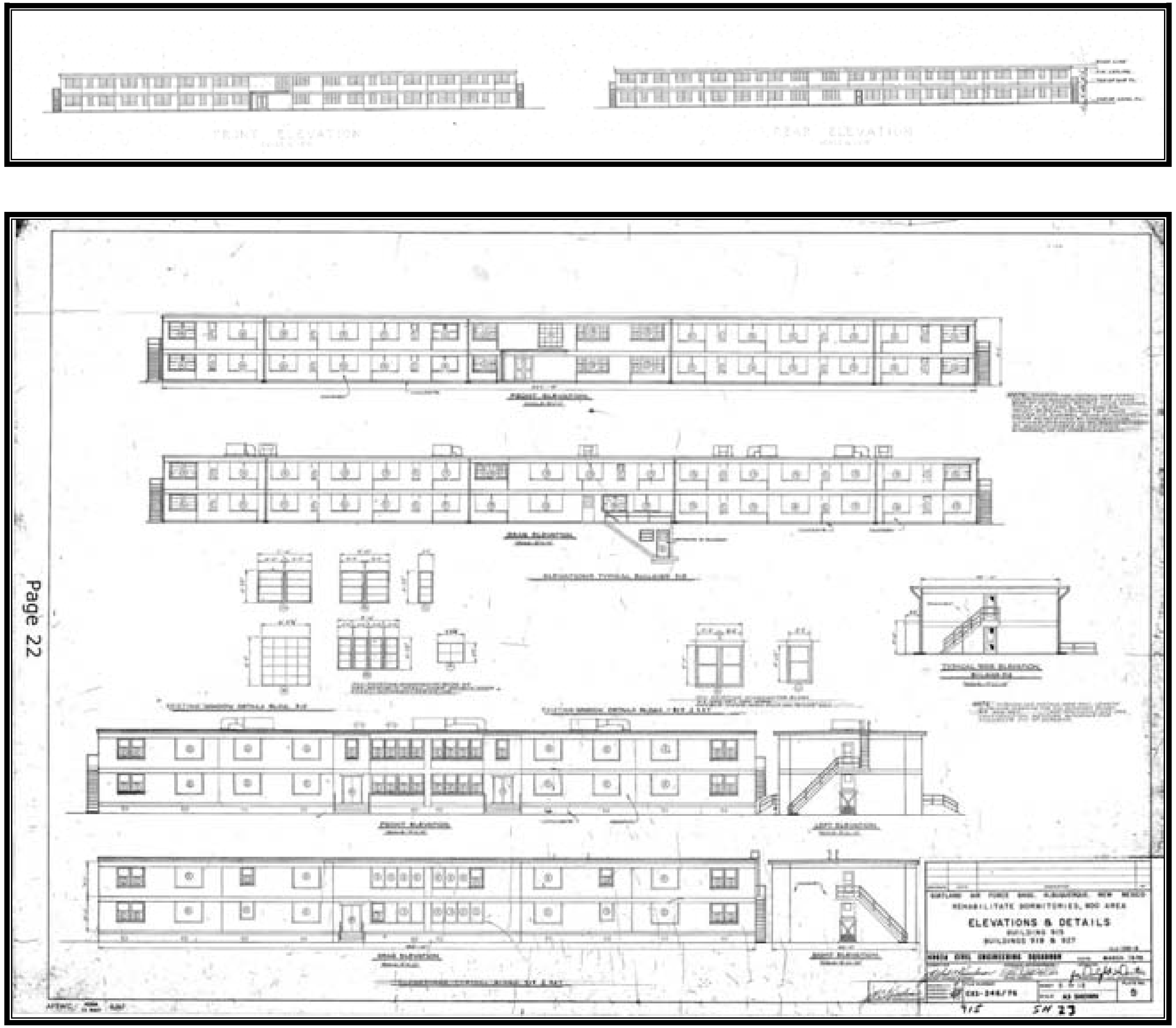


Plate 170 Typical elevation of 1950s dormitories (top), and Cold War era alterations from plans of 1976 (bottom) (Courtesy Kirtland Air Force Base)

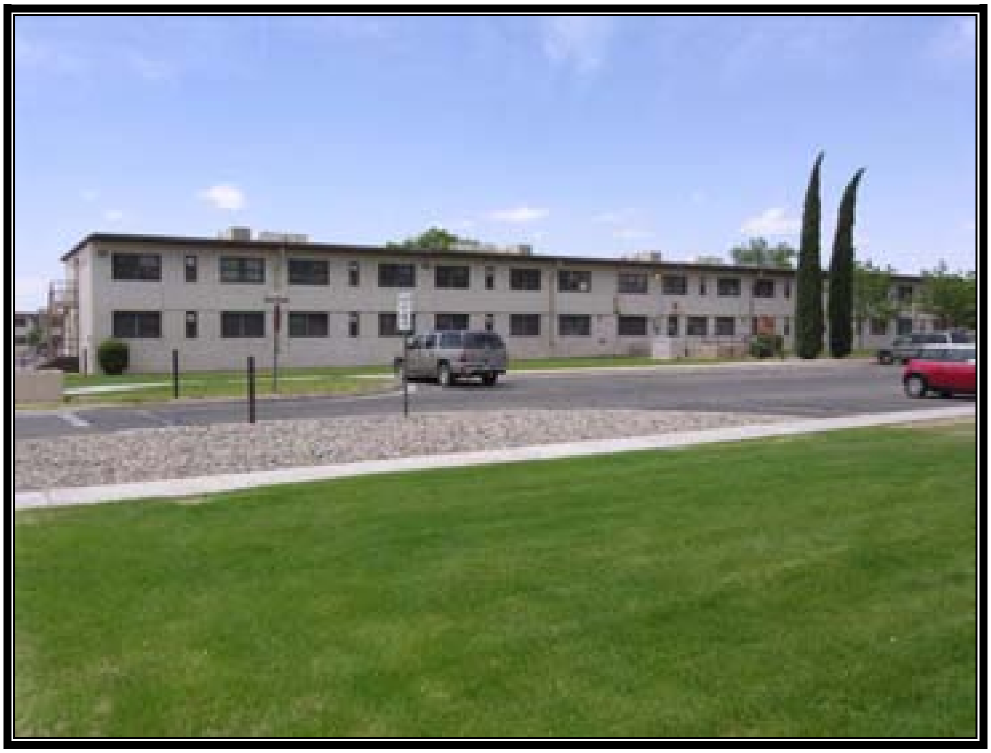


Plate 171 Building 917, east elevation (Photograph by RCG&A, 2008)

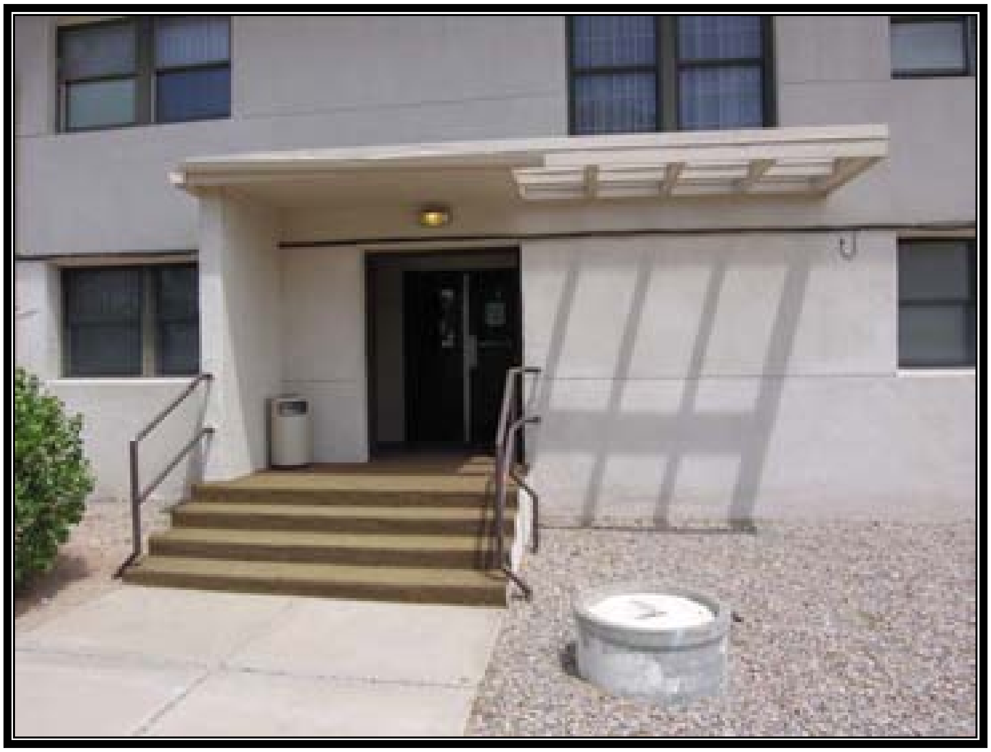


Plate 172 Detail of main entrance, Building 917 (Photograph by RCG&A, 2008)

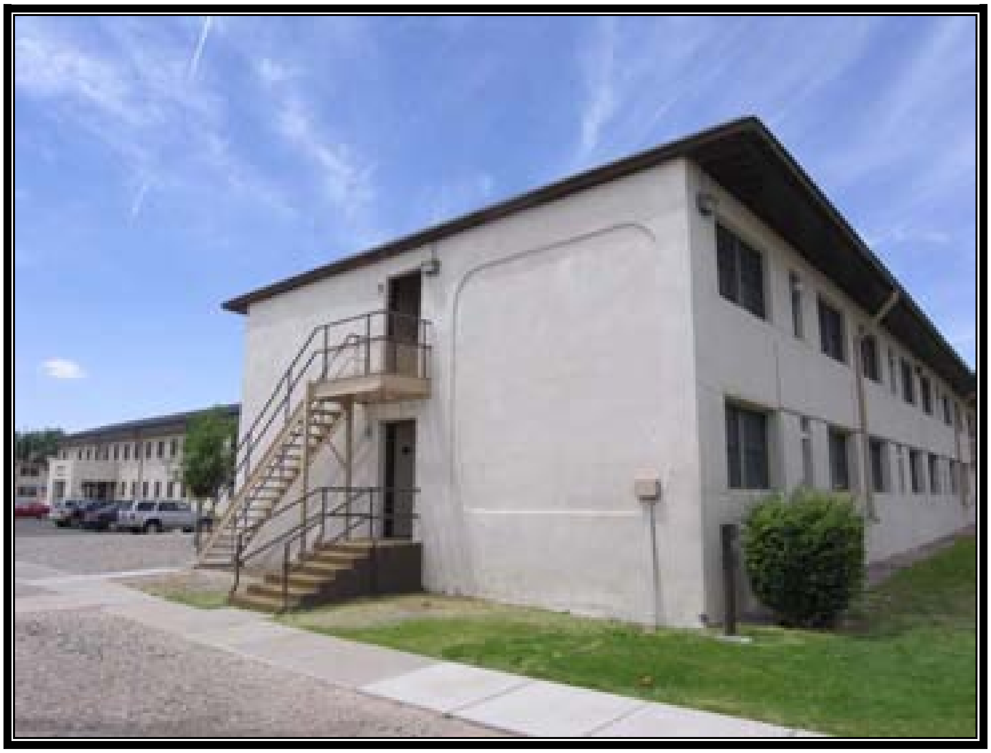


Plate 173 South elevation of Building 917 showing exterior finish (Photograph by RCG&A, 2008)

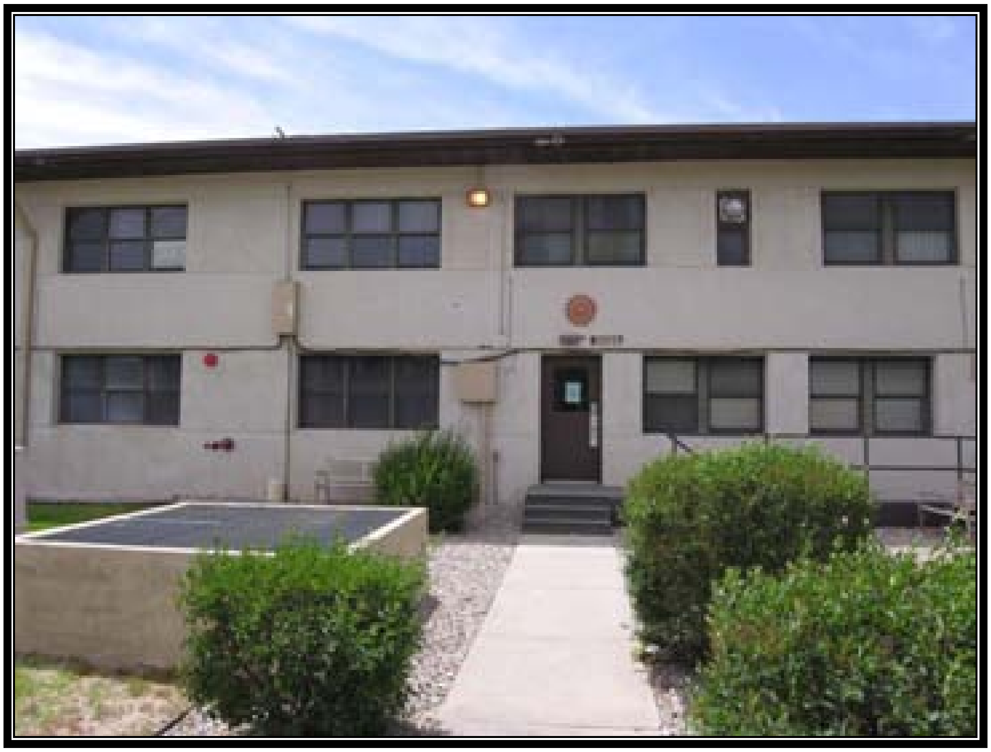


Plate 174 West elevation of Building 917 showing rear entrance and window details (Photograph by RCG&A, 2008)

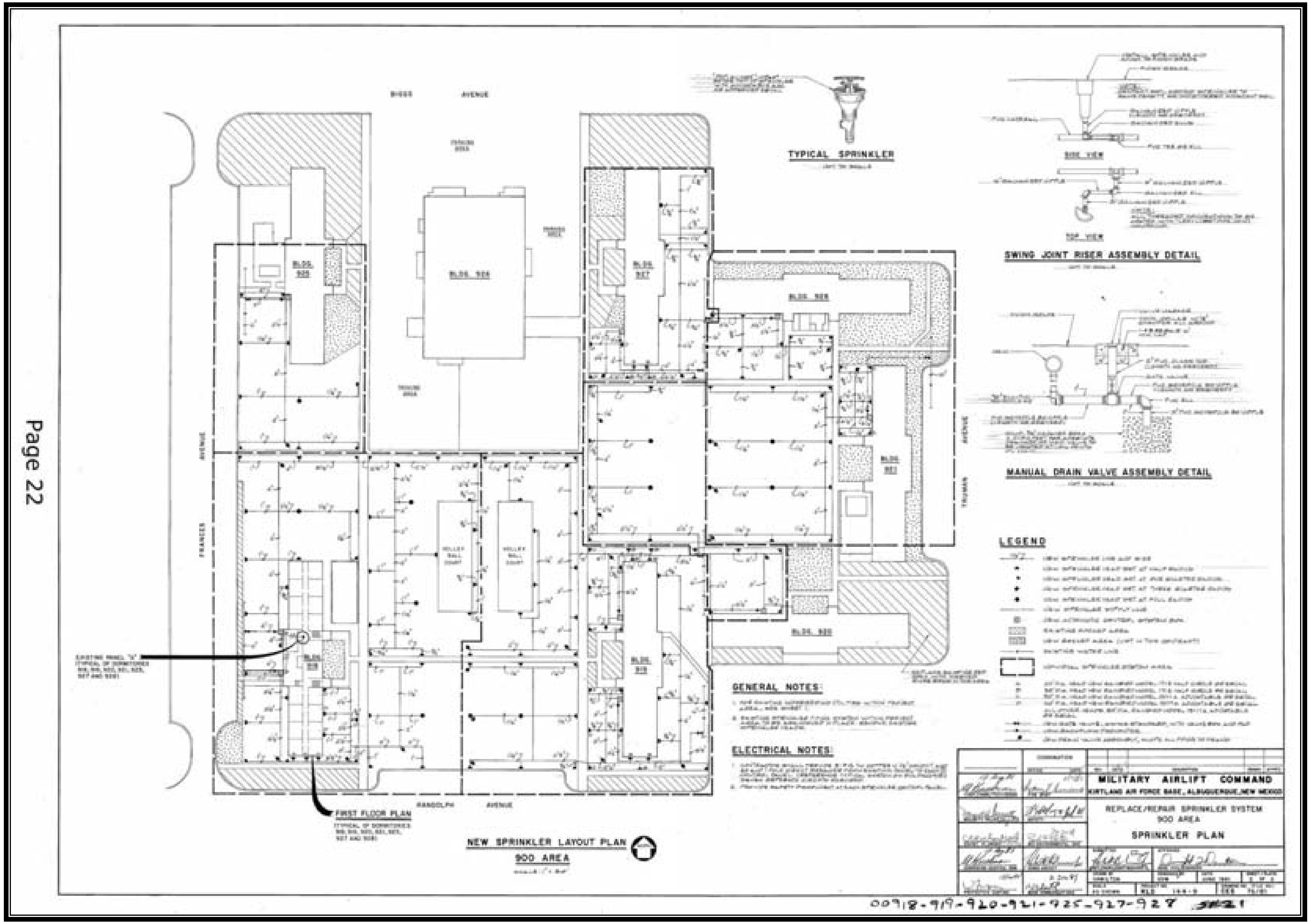


Plate 175 Dormitory area east of Building 917 (Courtesy Kirtland Air Force Base)

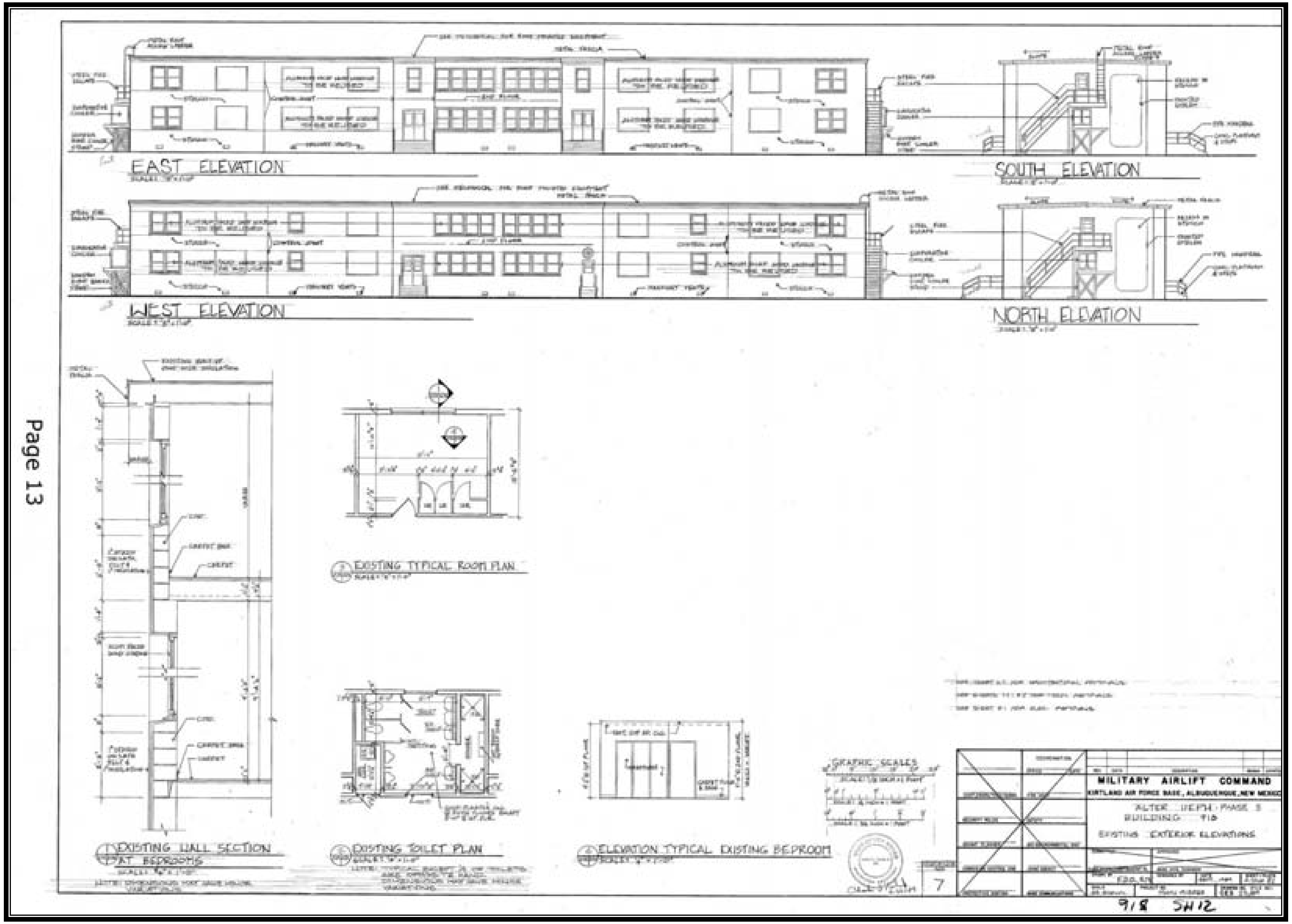

EAST ELEVATION
SOUTH ELEVATION
WEST ELEVATION
NORTH ELEVATION
Page 13
EXISTING TYPICAL ROOM PLAN
EXISTING HALL SECTION AT BEDROOMS
EXISTING TOILET PLAN
ELEVATION TYPICAL EXISTING BEDROOM
GRAPHIC SCALES
MILITARY AIRLIFT COMMAND
KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO
ALTER UEPH PHASE 3
BUILDING 918
EXISTING EXTERIOR ELEVATIONS
7
918 SH 12

Plate 176 Existing conditions of Building 918 in 1989 (Courtesy Kirtland Air Force Base)

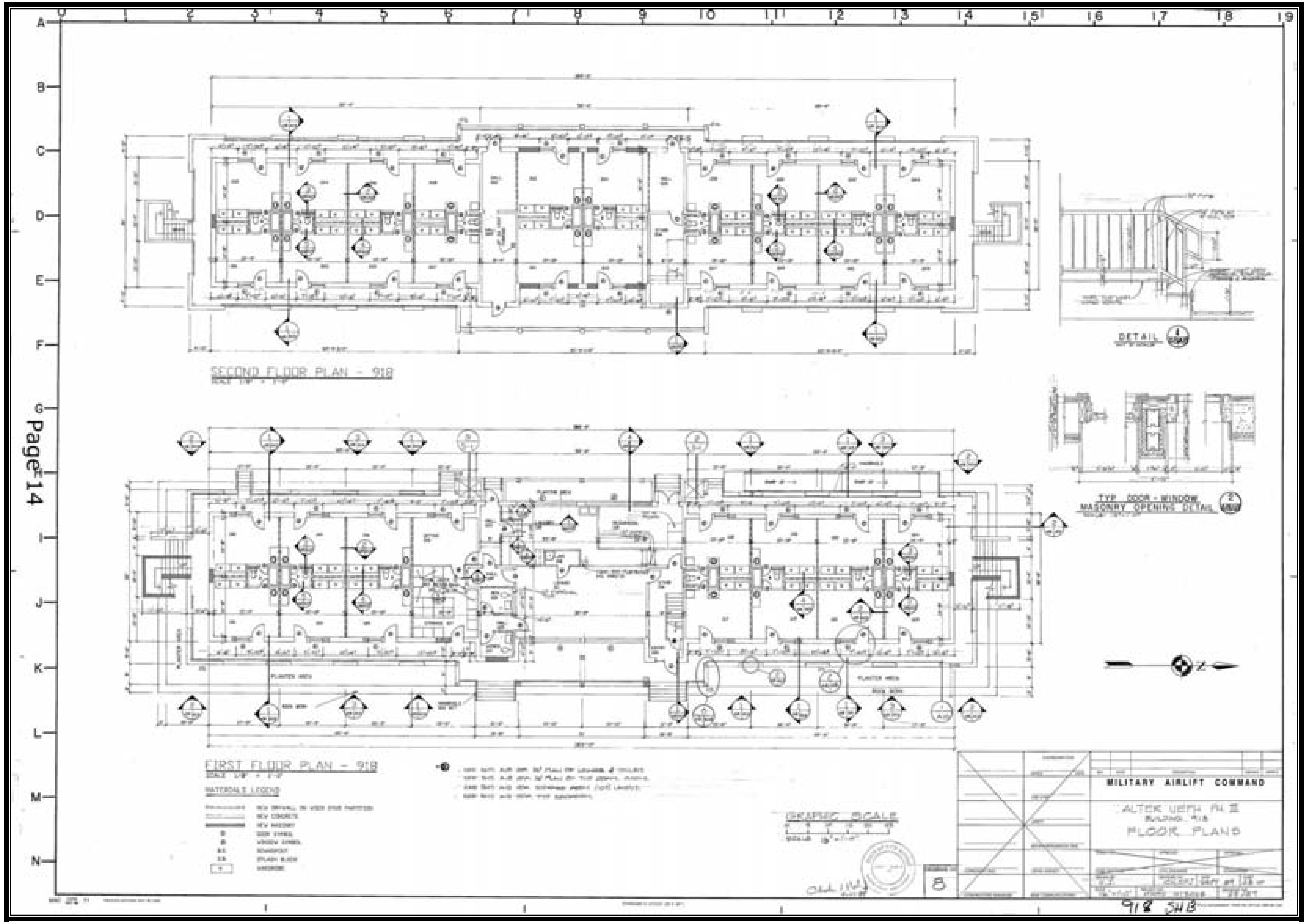


Plate 177 New floorplan for Building 918 developed in 1989 (Courtesy Kirtland Air Force Base)

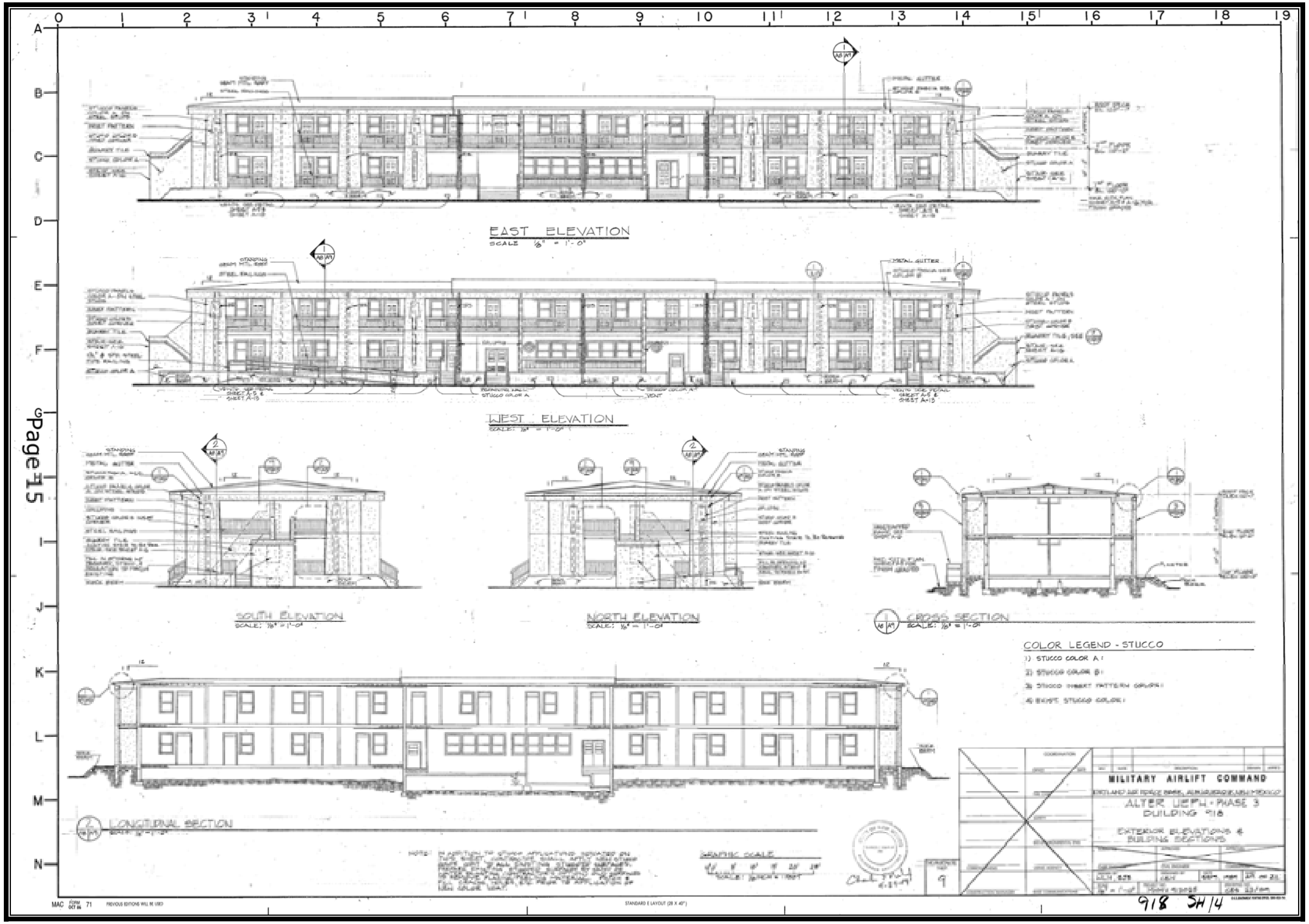


Plate 178 New exterior elevations of Building 918 developed in 1989 (Courtesy Kirtland Air Force Base)

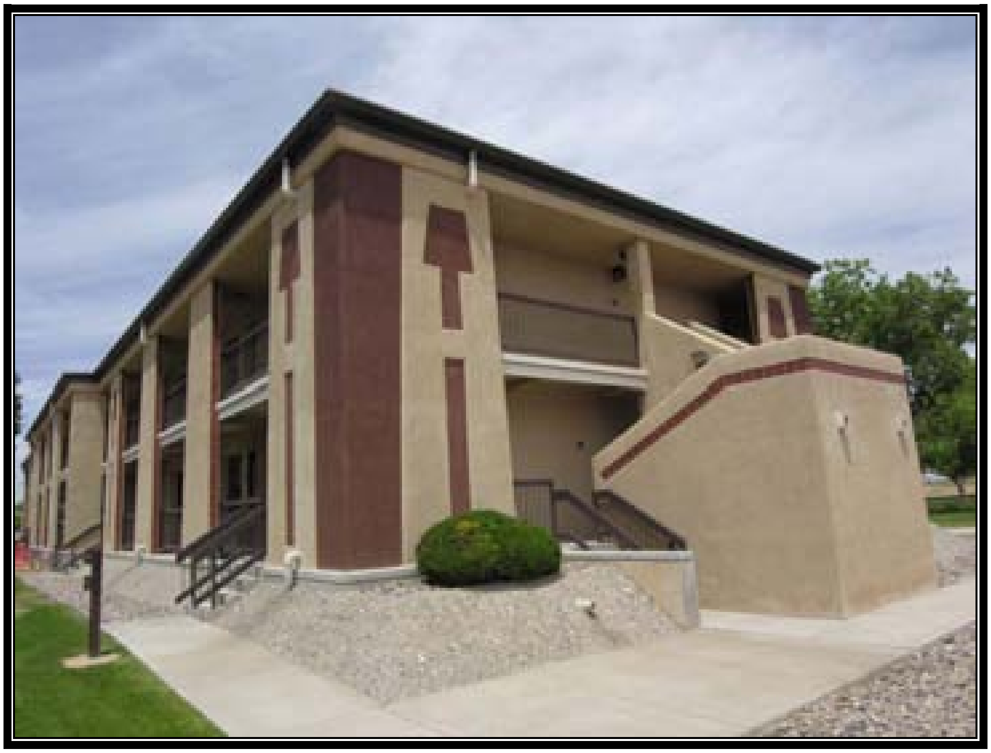


Plate 179 View of Building 918 looking northeast (Photograph by RCG&A, 2008)

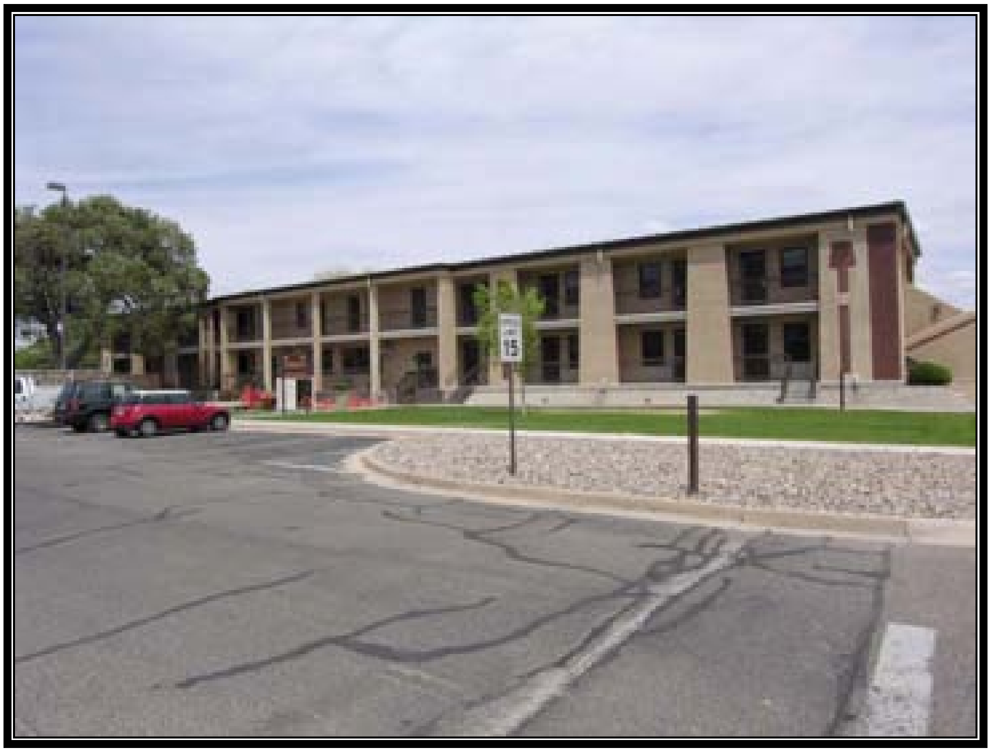


Plate 180 West elevation, Building 918 (Photograph by RCG&A, 2008)

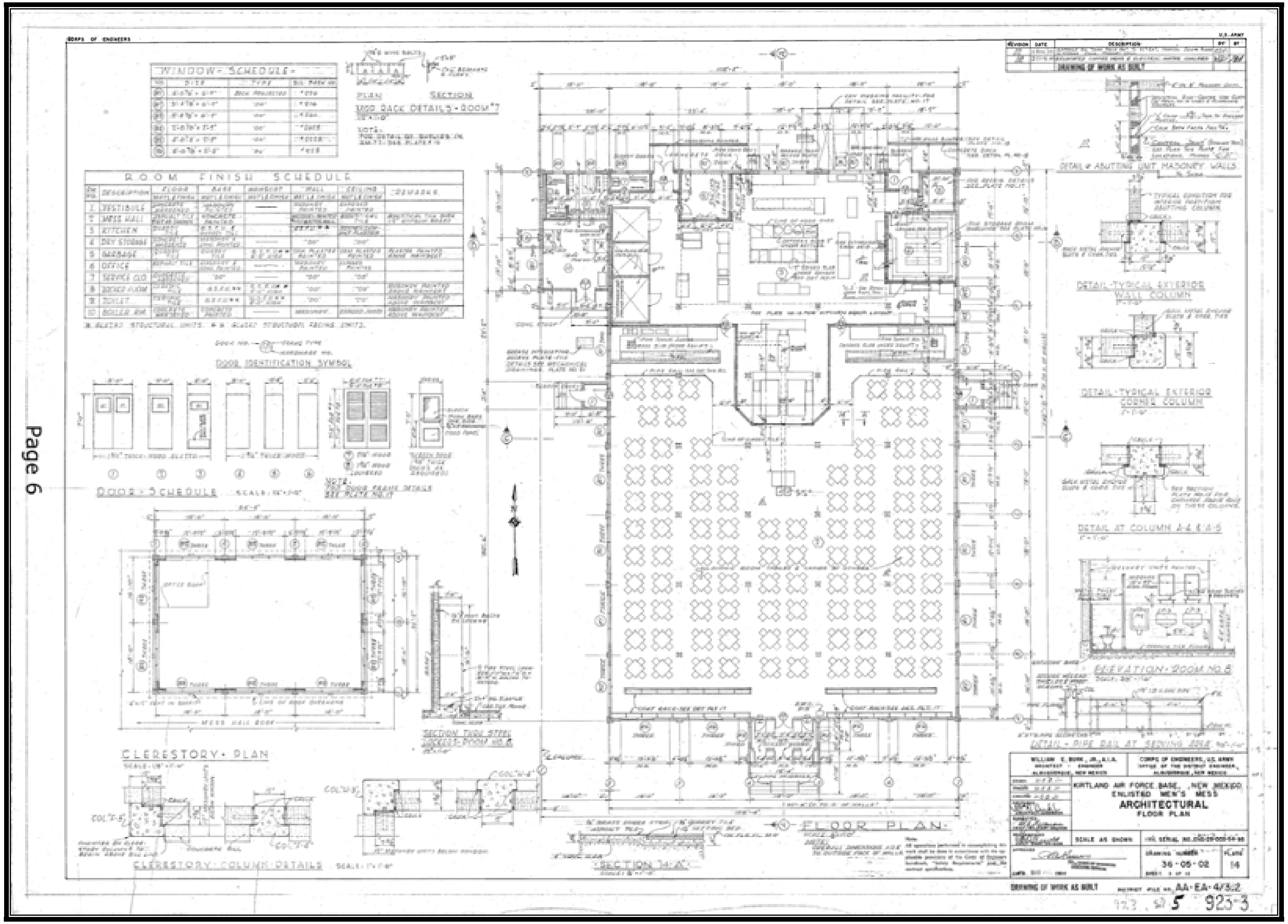


Plate 181 Plan for Building 923 developed in 1954 (Courtesy Kirtland Air Force Base)

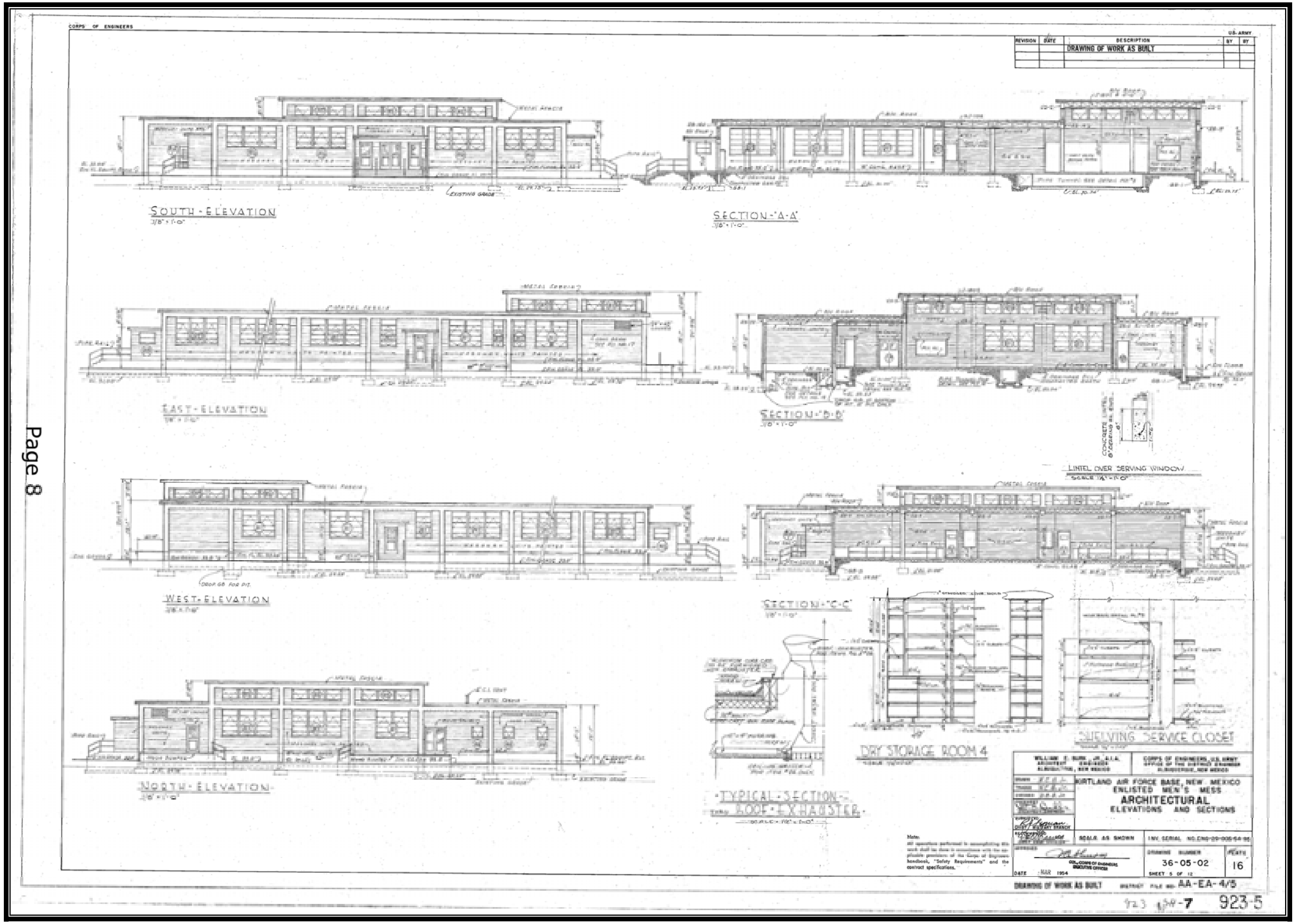


Plate 182 Elevations of Building 923 from plan developed in 1954 (Courtesy Kirtland Air Force Base)

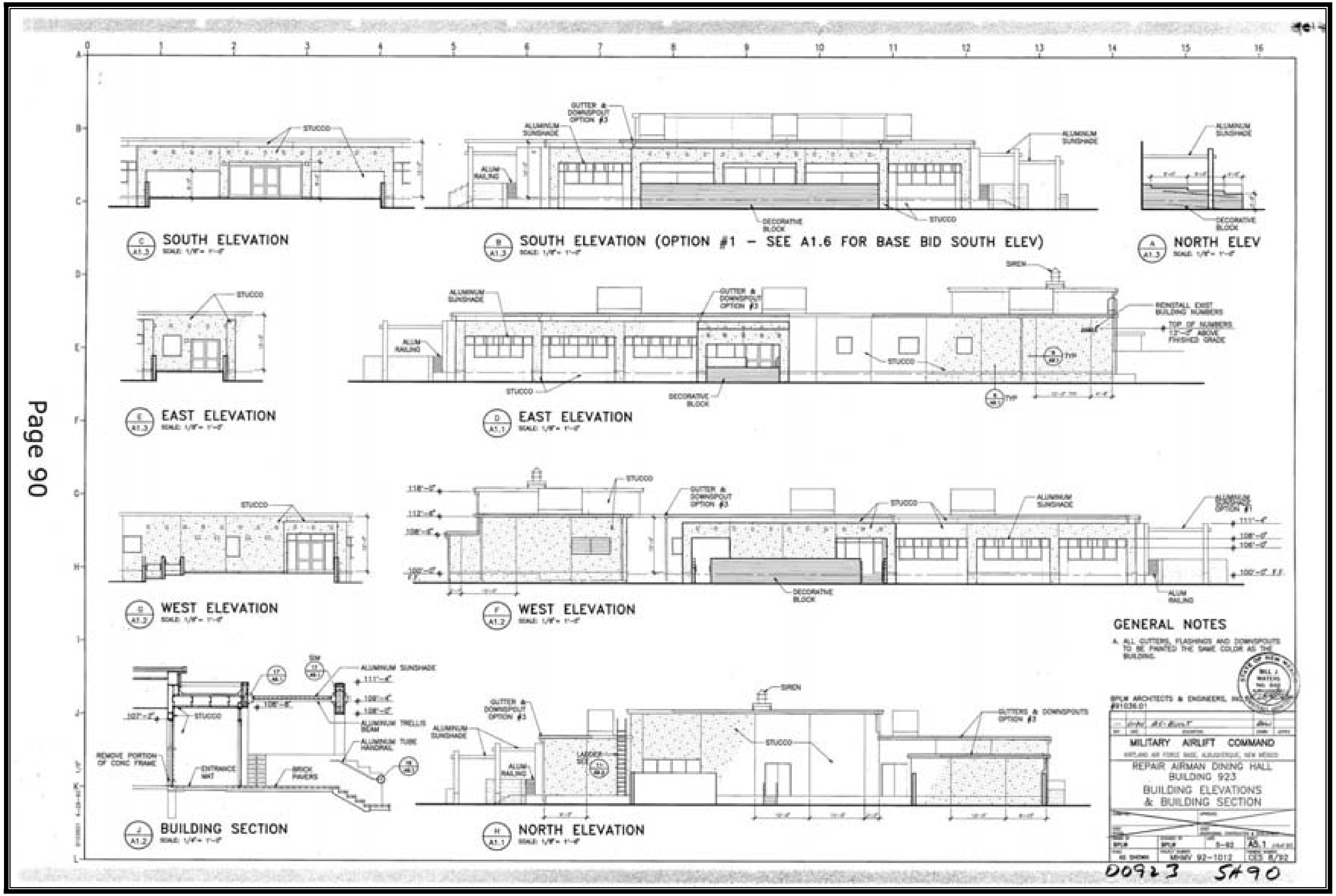


Plate 183 As-built drawings of new exterior elevations of Building 923 completed in 1995 (Courtesy Kirtland Air Force Base)

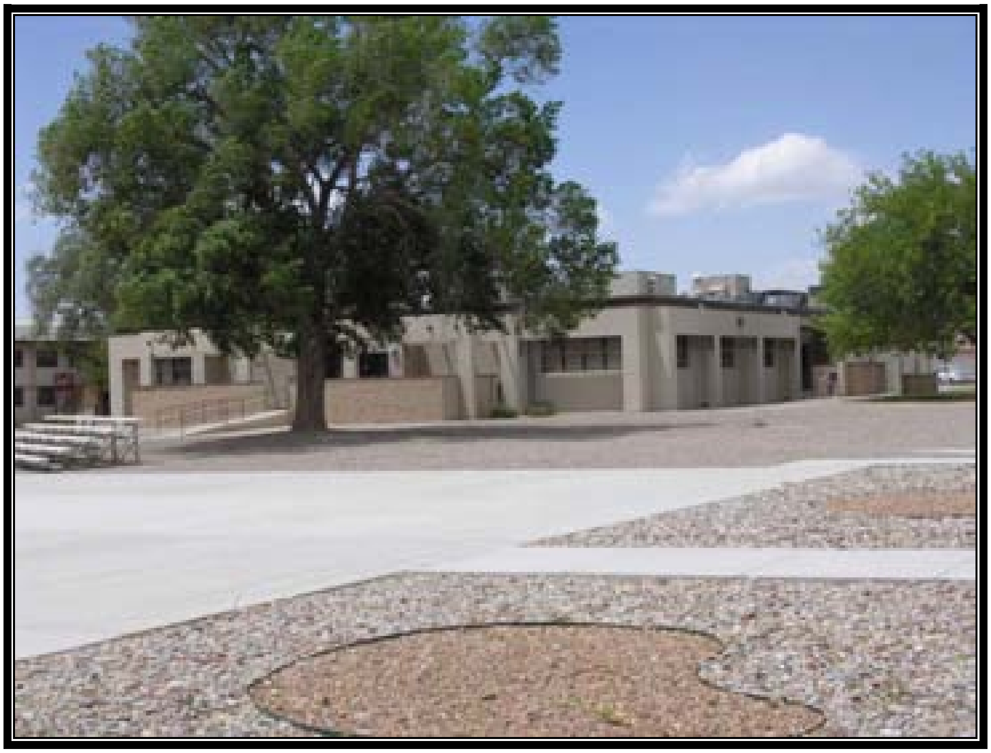


Plate 184 View of Building 923 looking northwest (Photograph by RCG&A, 2008)

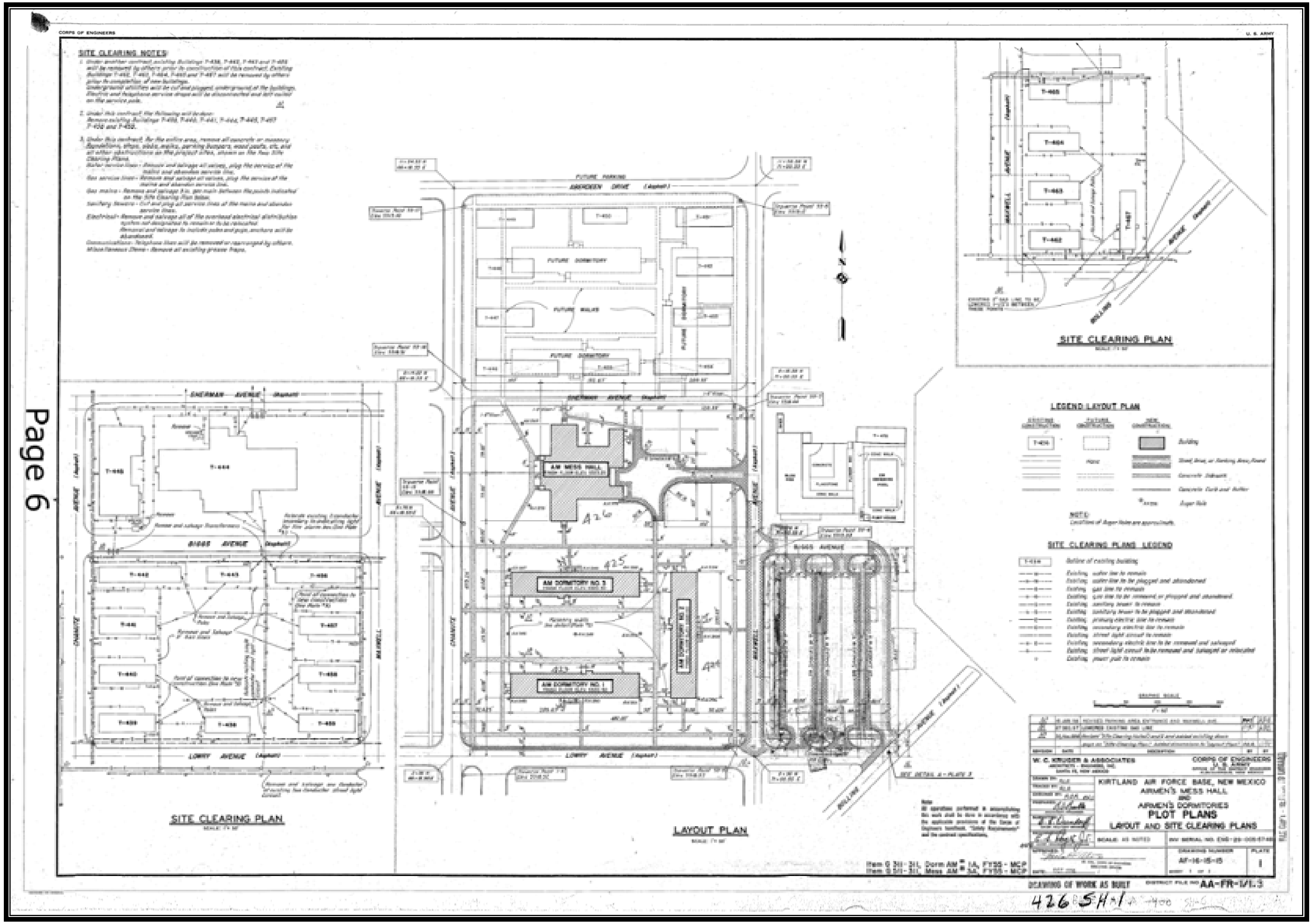


Plate 185 Plat of new 400 area dormitories (Courtesy Kirtland Air Force Base)

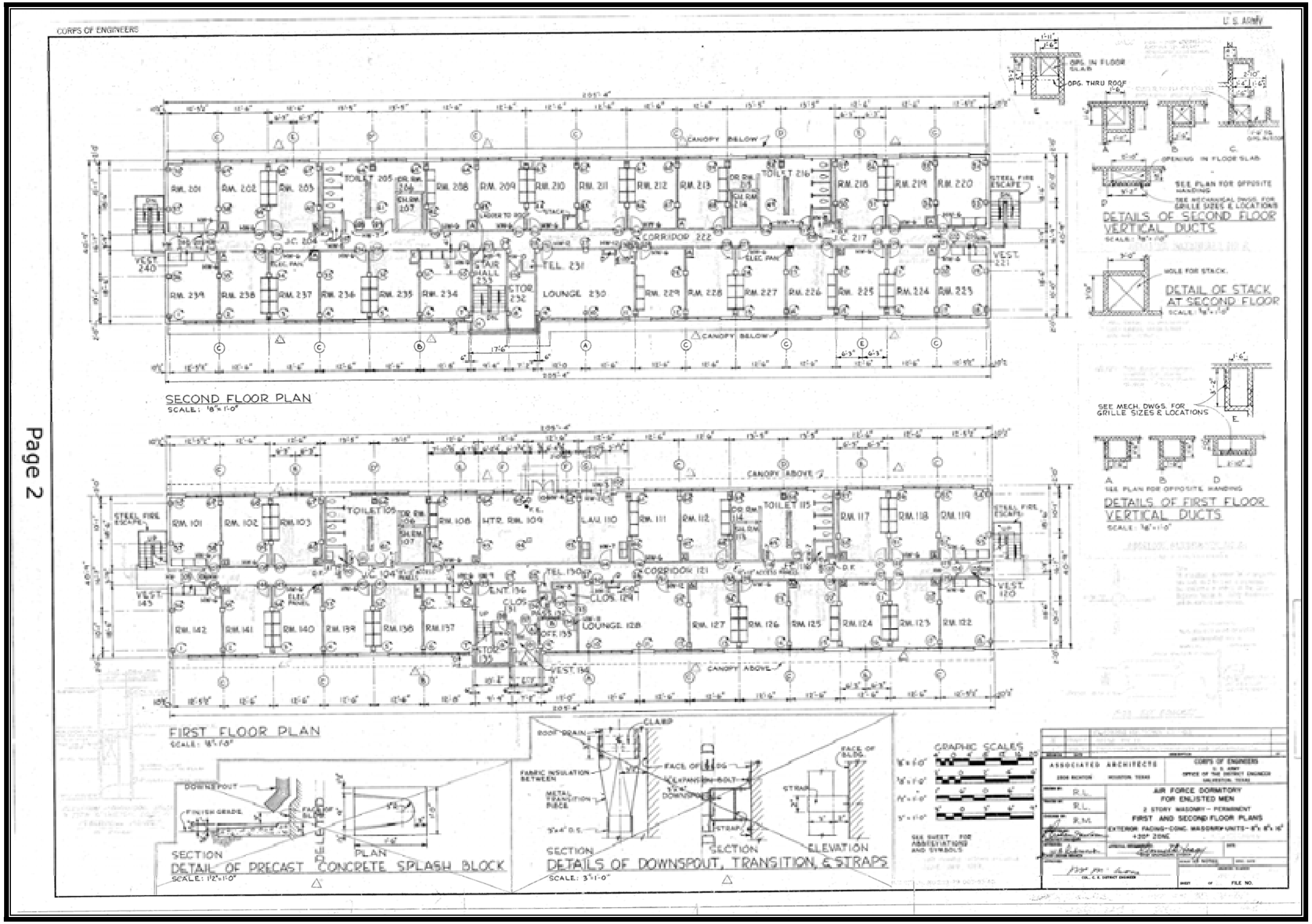

Page 2
CORPS OF ENGINEERS
U.S. ARMY
SECOND FLOOR PLAN
SCALE: 1/8"=1'-0"
FIRST FLOOR PLAN
SCALE: 1/8"=1'-0"
DETAILS OF SECOND FLOOR VERTICAL DUCTS
DETAIL OF STACK AT SECOND FLOOR
DETAILS OF FIRST FLOOR VERTICAL DUCTS
SEE MECH. DWGS. FOR GRILLE SIZES & LOCATIONS
DETAIL OF PRECAST CONCRETE SPLASH BLOCK
SCALE: 1½"=1'-0"
DETAILS OF DOWNSPOUT, TRANSITION, & STRAPS
SCALE: 3"=1'-0"
GRAPHIC SCALES
CANOPY BELOW
CANOPY ABOVE
CORRIDOR 222
CORRIDOR 121
LOUNGE 230
LOUNGE 128
STEEL FIRE ESCAPE
ASSOCIATED ARCHITECTS
HOUSTON, TEXAS
CORPS OF ENGINEERS
U.S. ARMY
OFFICE OF THE DISTRICT ENGINEER
GALVESTON, TEXAS
AIR FORCE DORMITORY
FOR ENLISTED MEN
2 STORY MASONRY - PERMANENT
FIRST AND SECOND FLOOR PLANS
EXTERIOR FACING-CONC. MASONRY UNITS
COL., C. E. DISTRICT ENGINEER
SHEET OF FILE NO.

Plate 186 Floorplan developed for Building 423 in 1957 (Courtesy Kirtland Air Force Base)

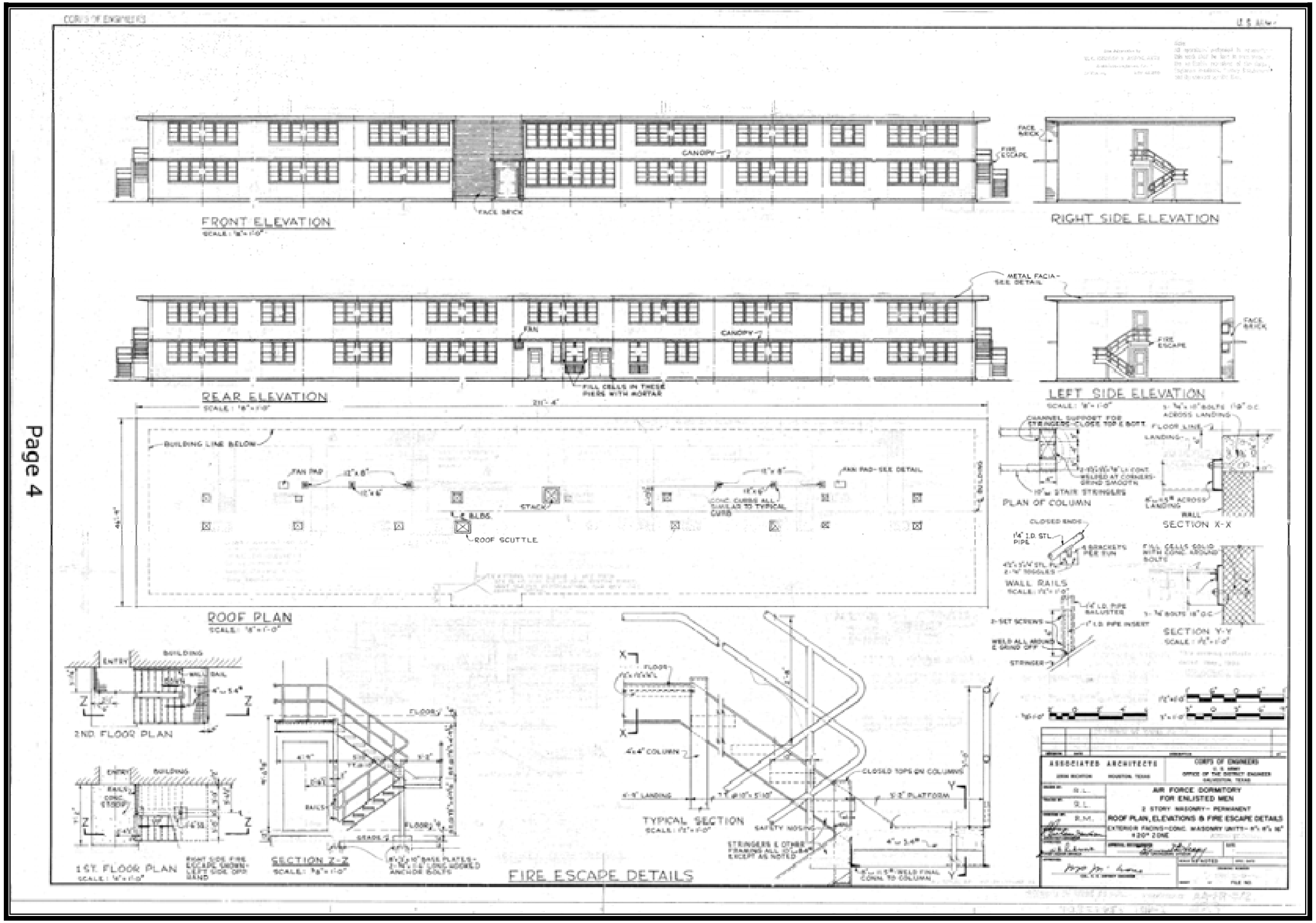


Plate 187 Elevation drawings for Building 423 developed in 1957 (Courtesy Kirtland Air Force Base)

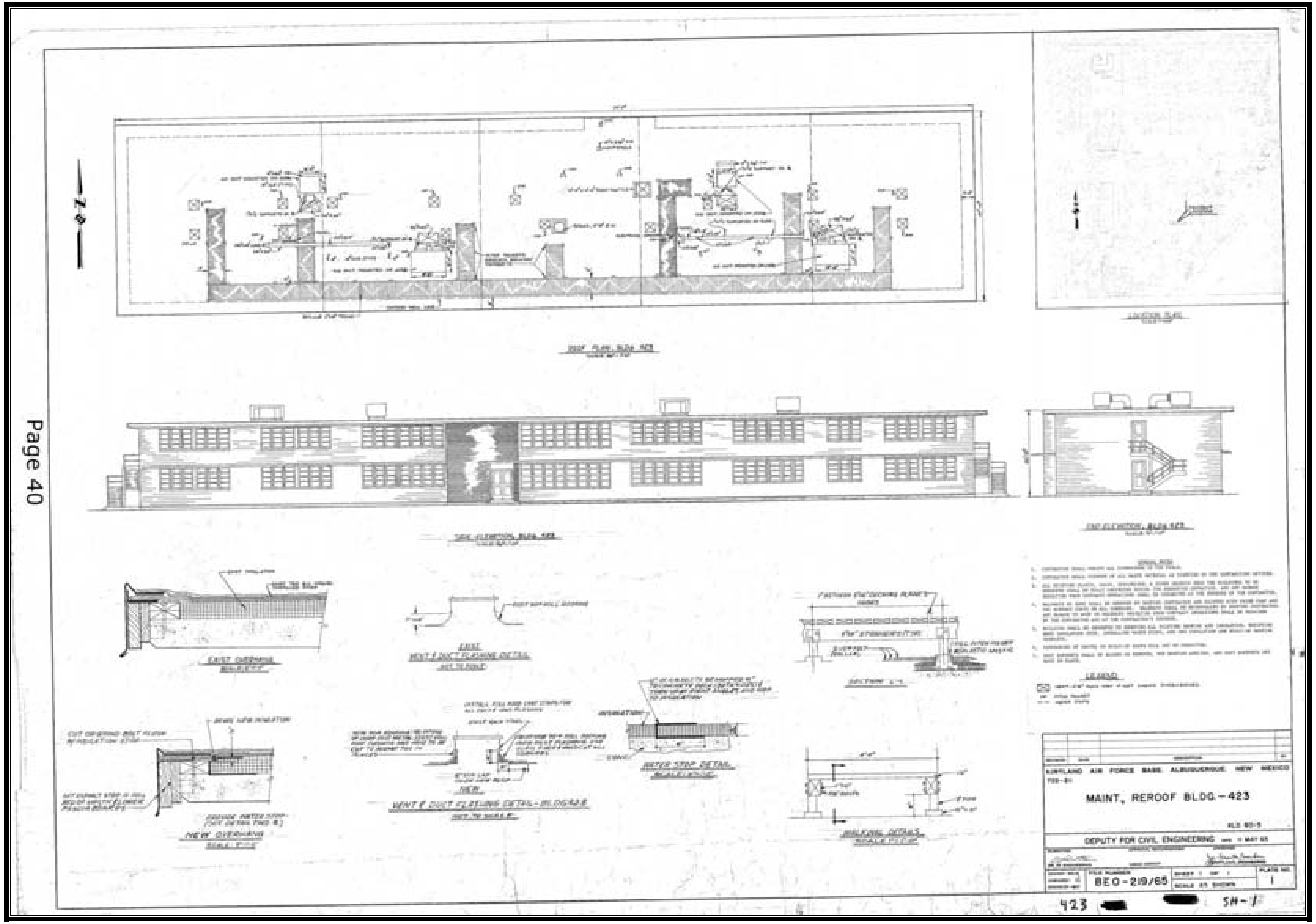

Page 40
KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO
MAINT, REROOF BLDG.-423
DEPUTY FOR CIVIL ENGINEERING
BEO-219/65
1
423 [redacted] [redacted] SH-1

Plate 188 Existing conditions of Building 423 in 1965 (Courtesy Kirtland Air Force Base)

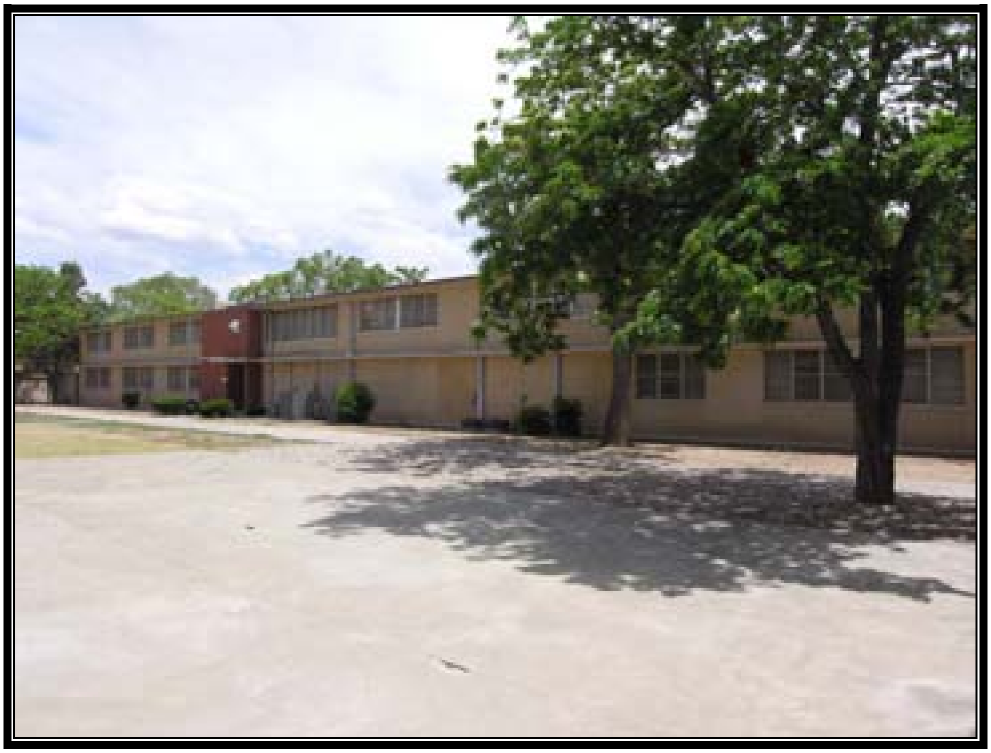


Plate 189 North elevation, Building 423 (Photograph by RCG&A, 2008)

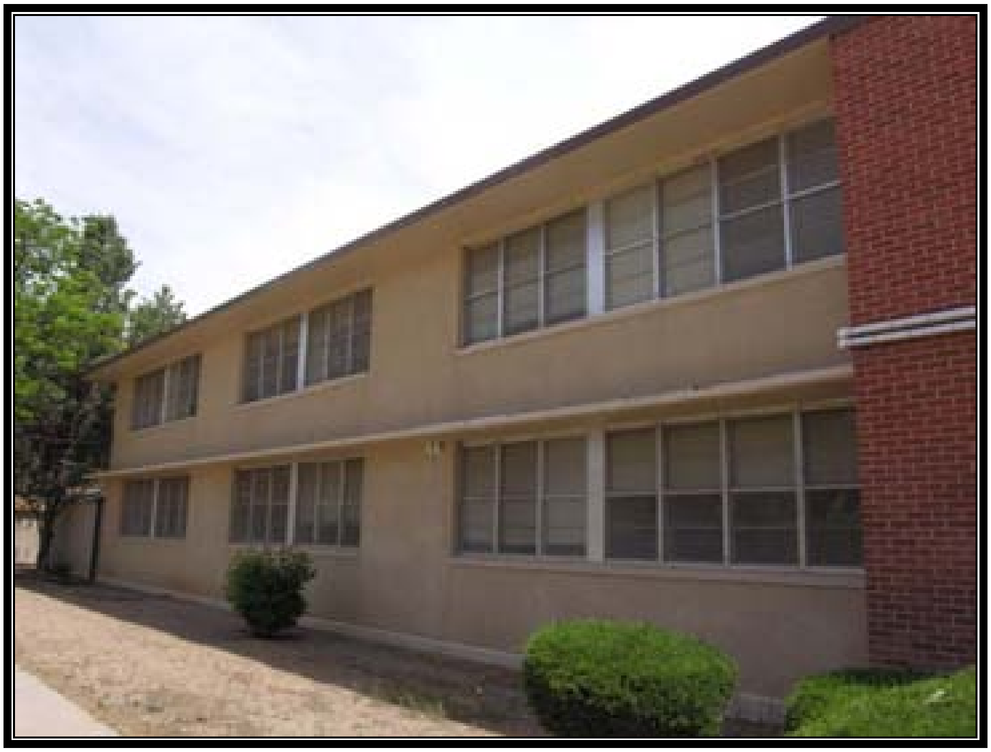


Plate 190 Detail of wall and windows, Building 423 (Photograph by RCG&A, 2008)

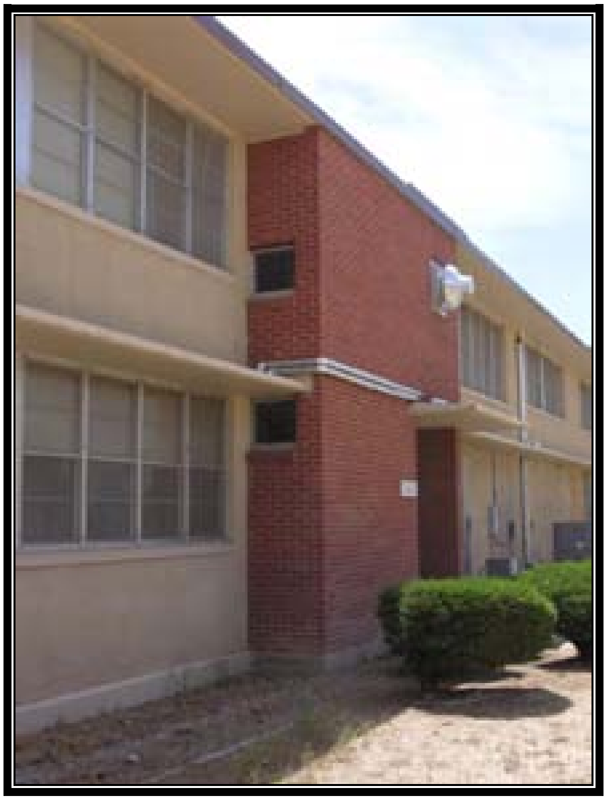


Plate 191 Entry detail, Building 423 (Photograph by RCG&A, 2008)

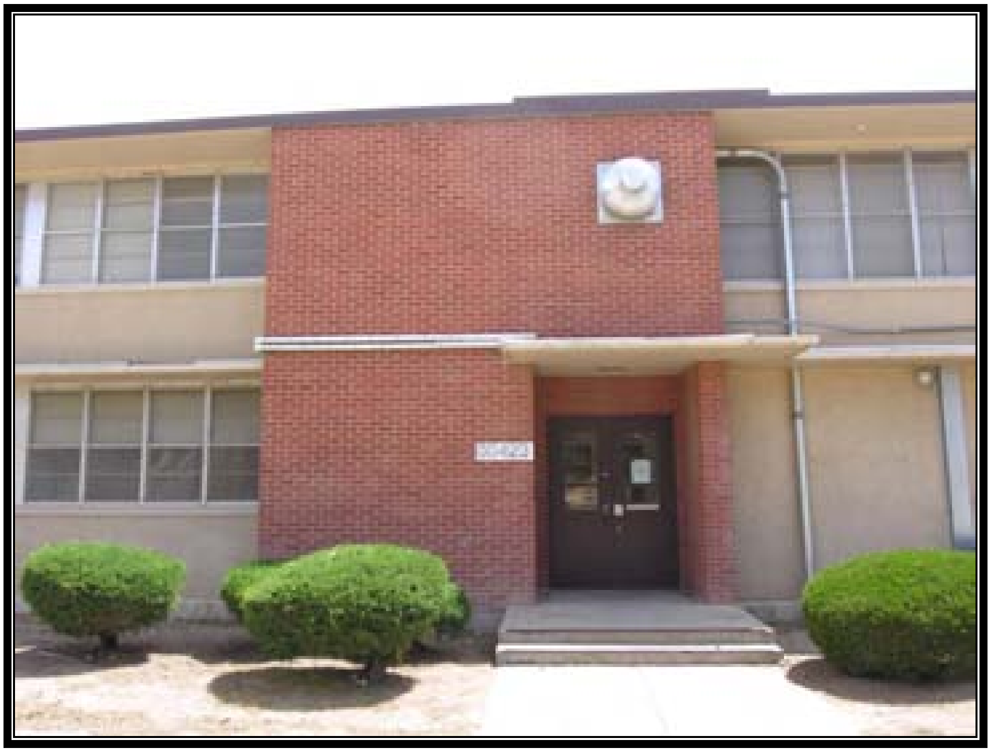


Plate 192 Entry of Building 423 showing concrete canopy (Photograph by RCG&A, 2008)

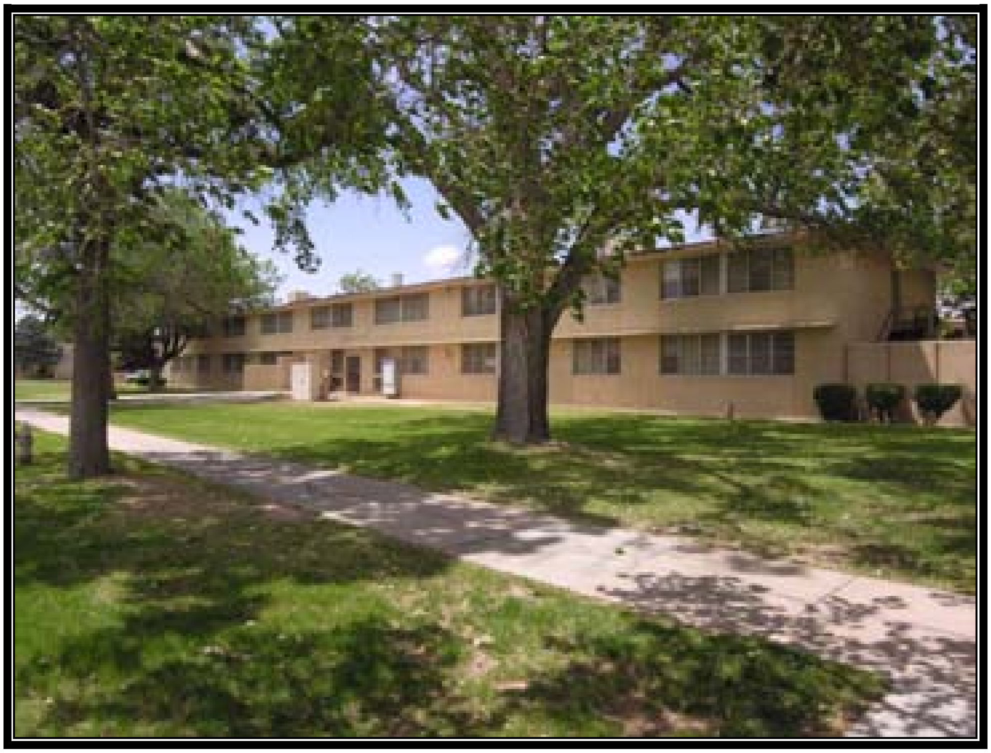


Plate 193 South elevation, Building 423 (Photograph by RCG&A, 2008)

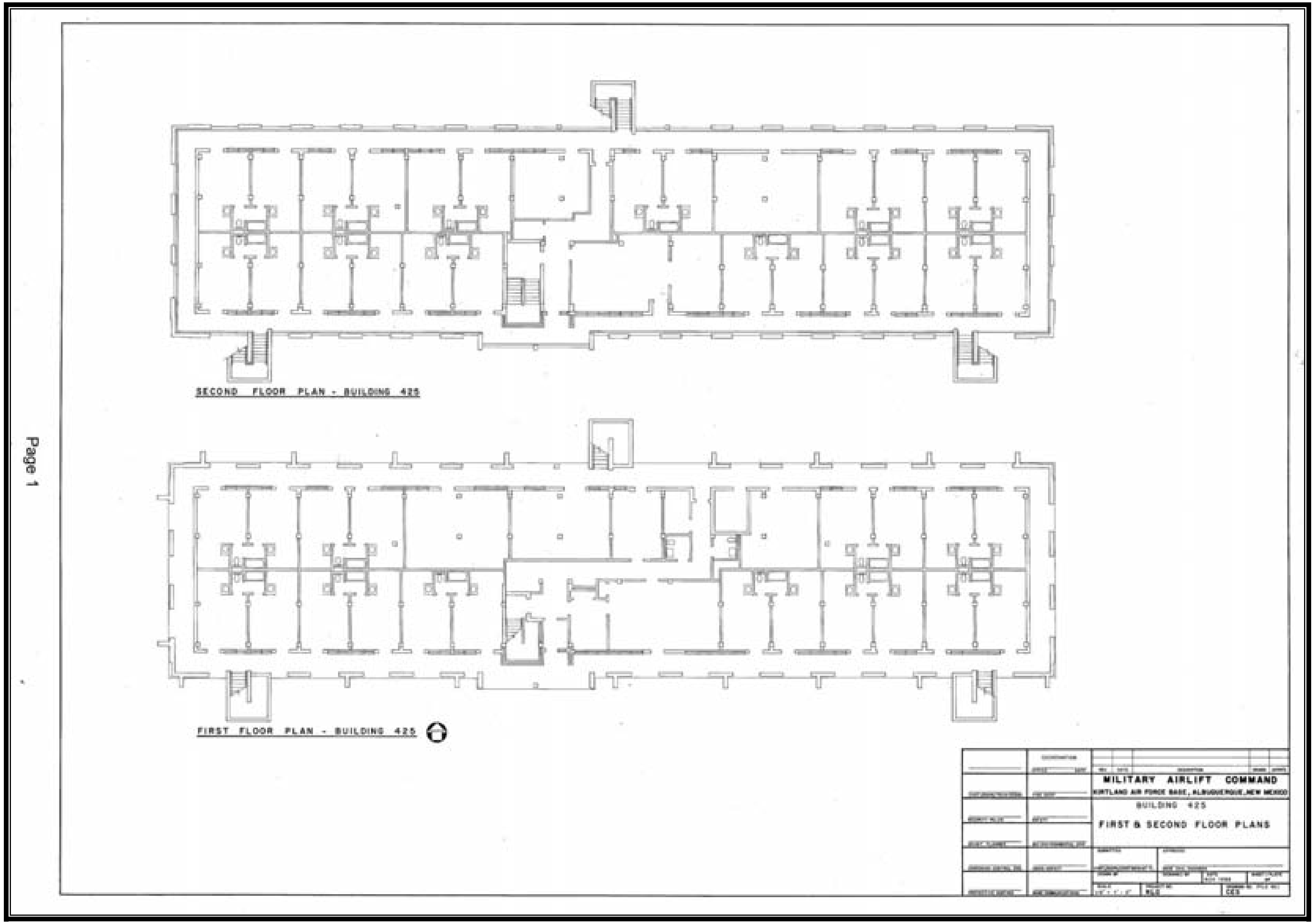

SECOND FLOOR PLAN - BUILDING 425
FIRST FLOOR PLAN - BUILDING 425
MILITARY AIRLIFT COMMAND
KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO
BUILDING 425
FIRST & SECOND FLOOR PLANS
CES
Page 1

Plate 194 New floorplans for Building 425 developed in 1988 (Courtesy Kirtland Air Force Base)

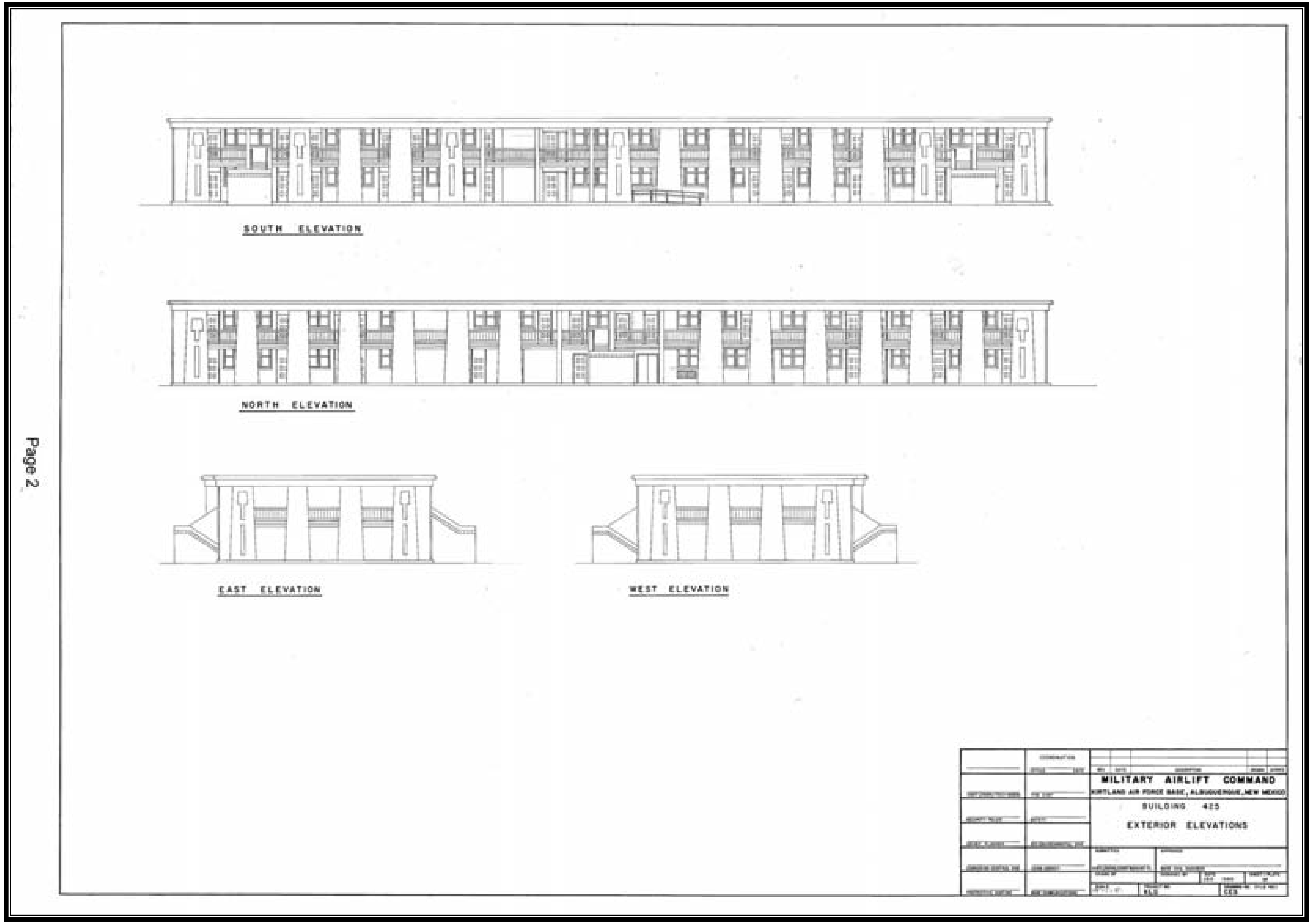


Plate 195 New exterior elevations for Building 425 developed in 1989 (Courtesy Kirtland Air Force Base)

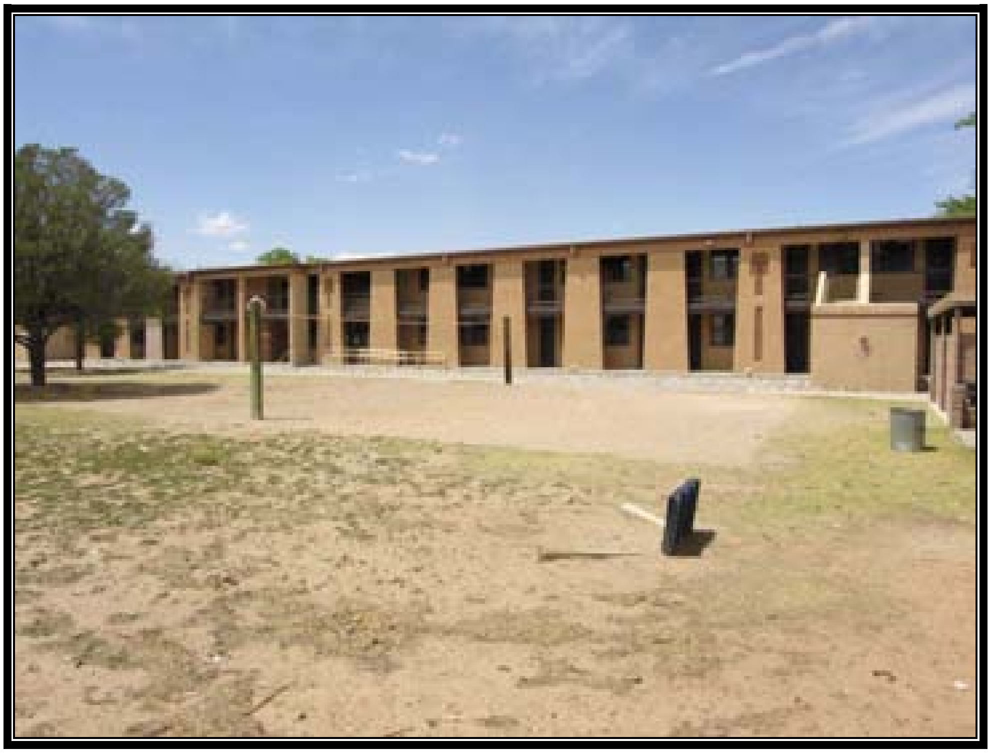


Plate 196 South elevation, Building 425 (Photograph by RCG&A, 2008)

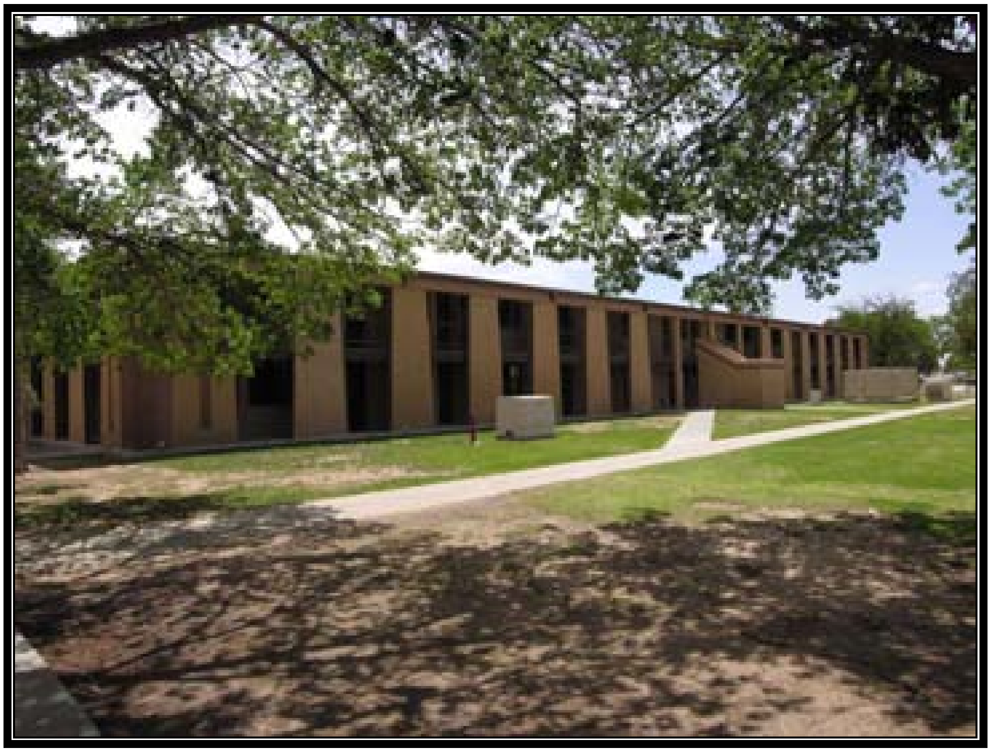


Plate 197 North elevation, Building 425 (Photograph by RCG&A, 2008)

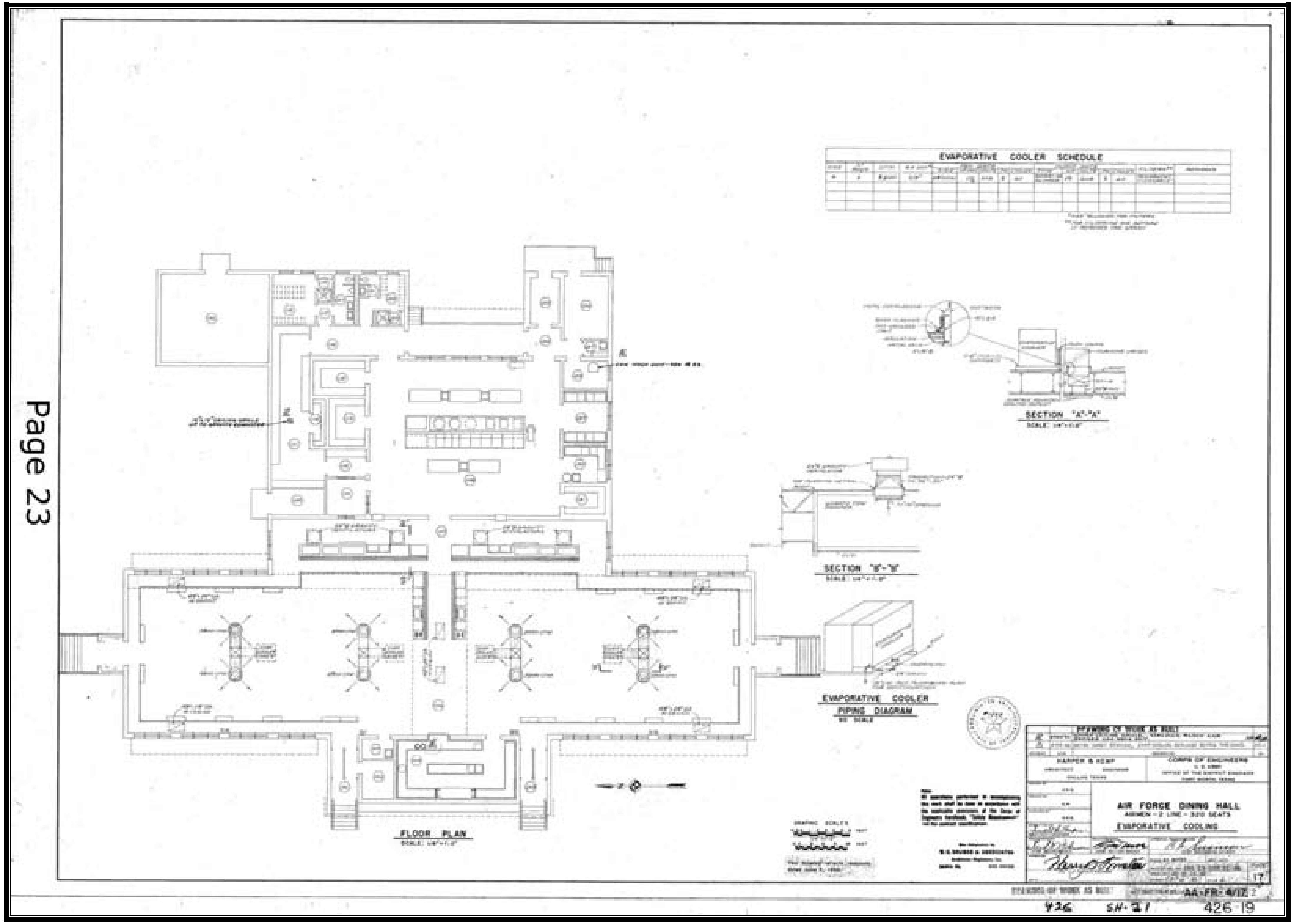
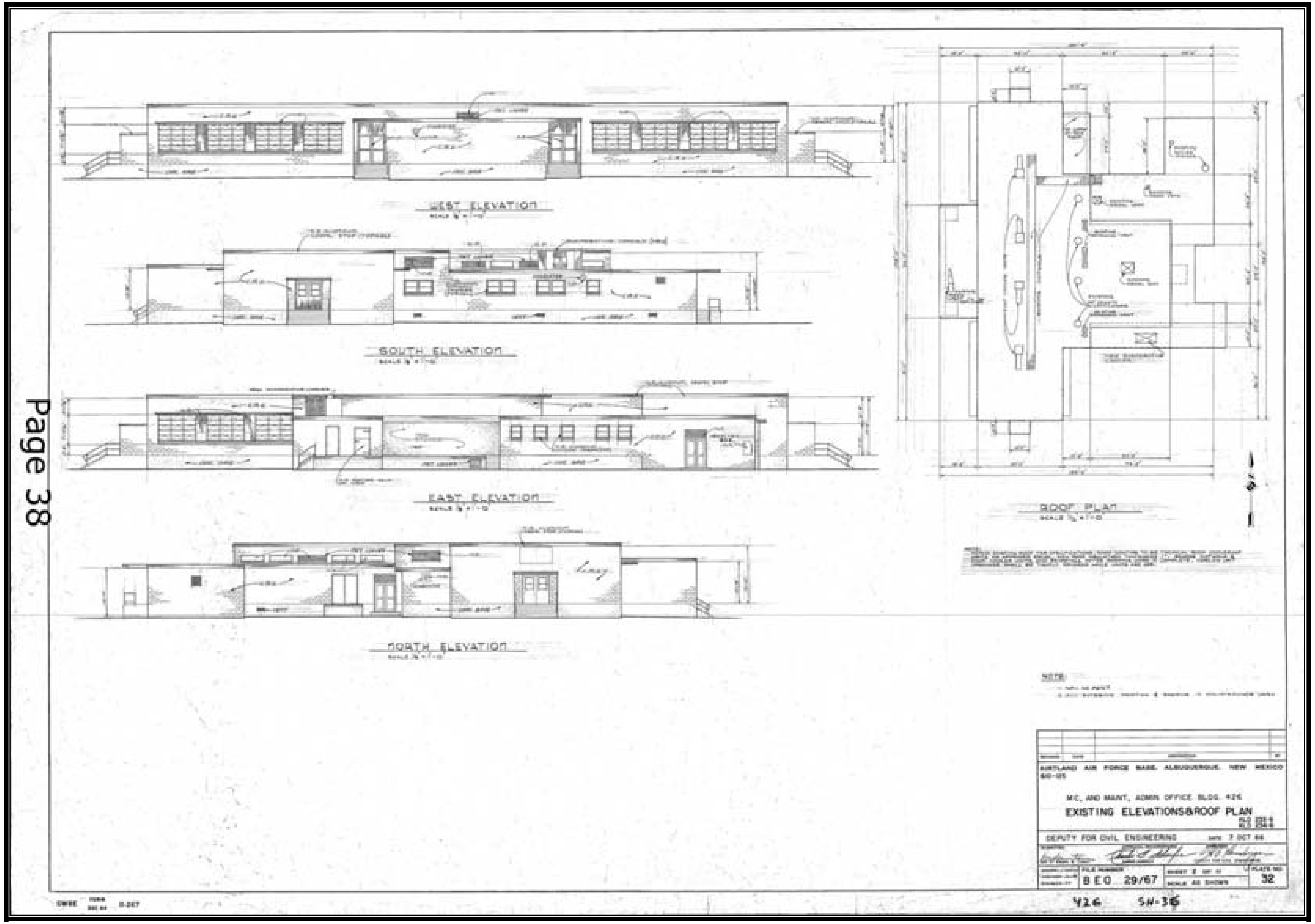


Plate 198 Floorplan of Building 426 developed in 1956 (Courtesy Kirtland Air Force Base)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WEST ELEVATION
SOUTH ELEVATION
EAST ELEVATION
NORTH ELEVATION
ROOF PLAN
NOTE:
KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NEW MEXICO
MC. AND MAINT. ADMIN OFFICE BLDG. 426
EXISTING ELEVATIONS&ROOF PLAN
DEPUTY FOR CIVIL ENGINEERING
7 OCT 66
FILE NUMBER
BEO 29/67
SCALE AS SHOWN
PLATE NO.
32
426
SW-36

Plate 199 Existing condition elevations of Building 426 from 1966 plans (Courtesy Kirtland Air Force Base)

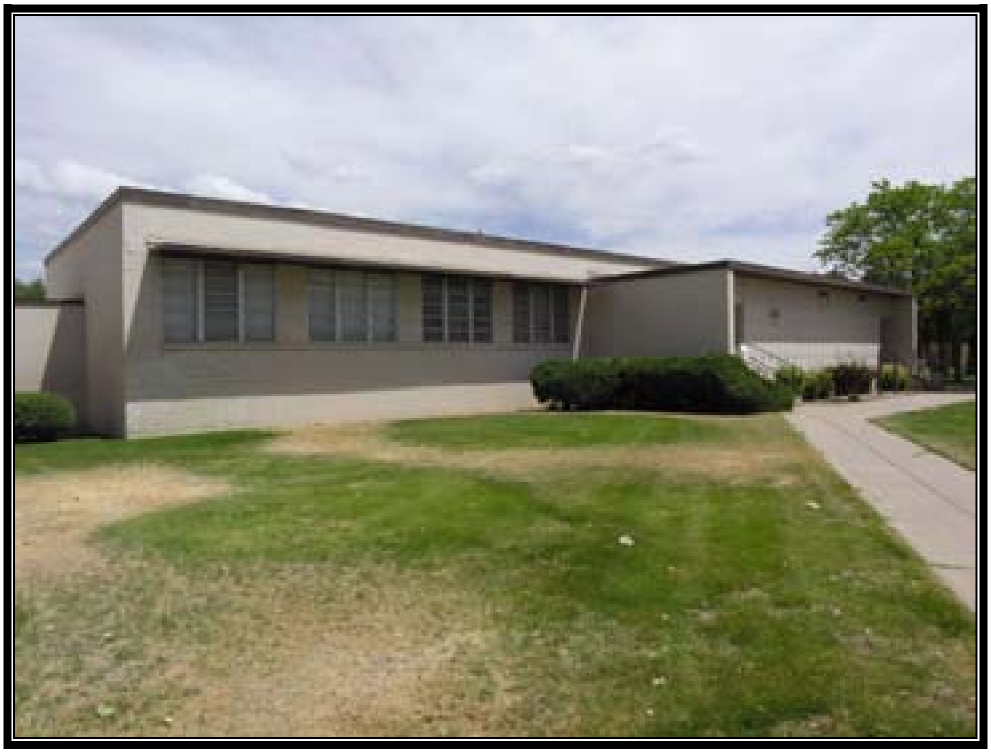

Plate 200 View of Building 426 looking southeast (Photograph by RCG&A, 2008)

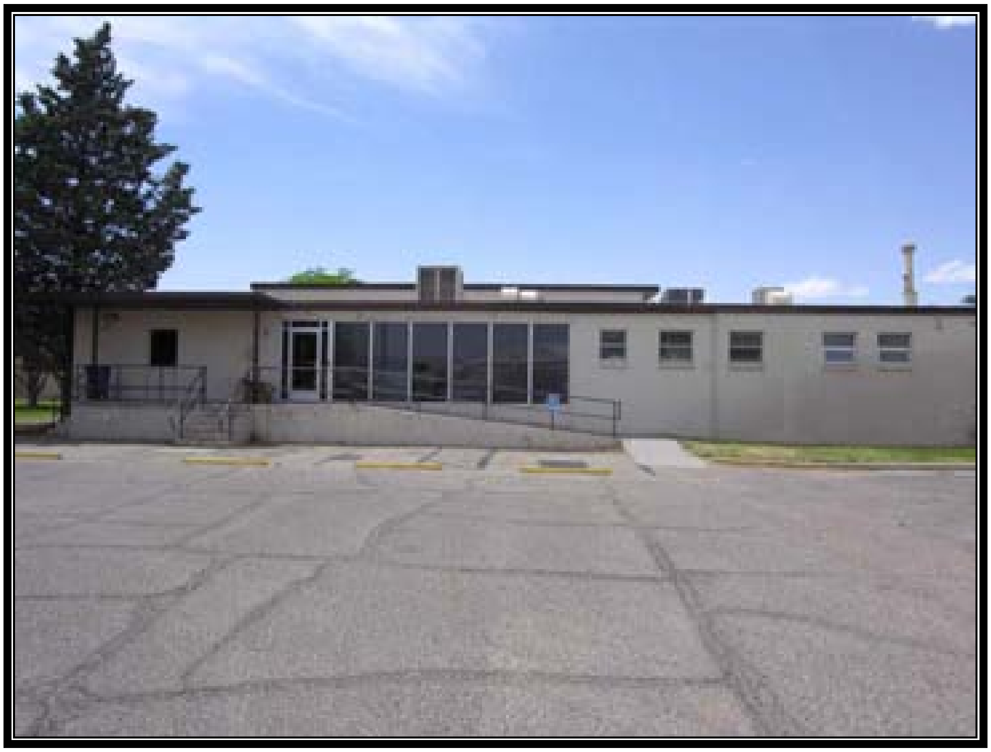

Plate 201 East elevation, Building 426 (Photograph by RCG&A, 2008)

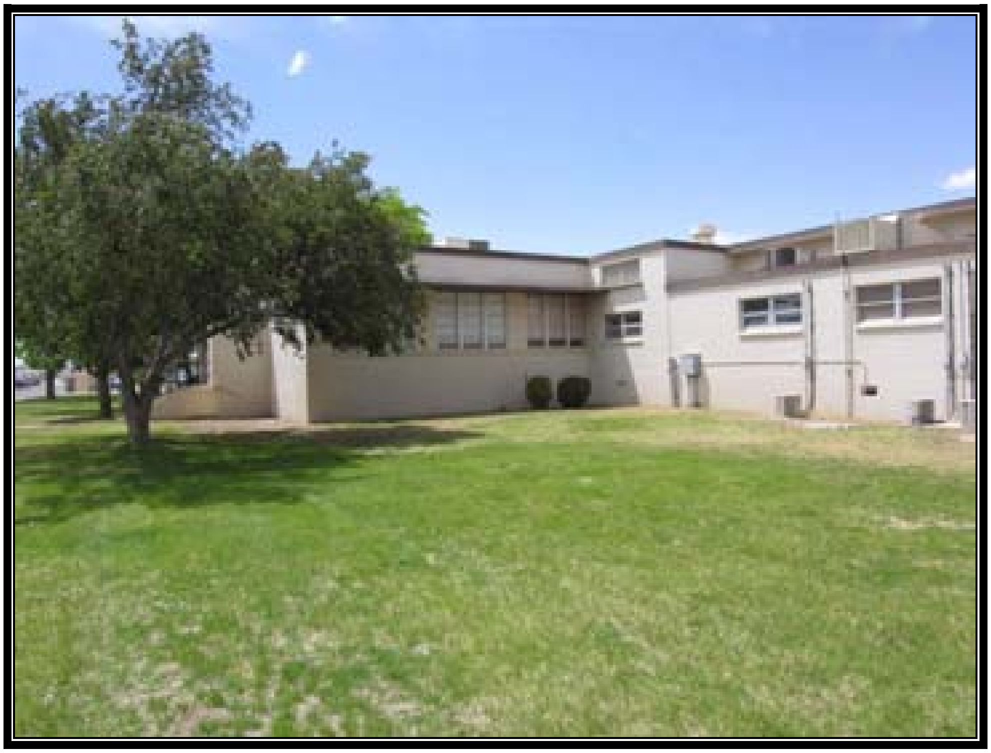

Plate 202 East wall of original dining area showing original windows (Photograph by RCG&A, 2008)

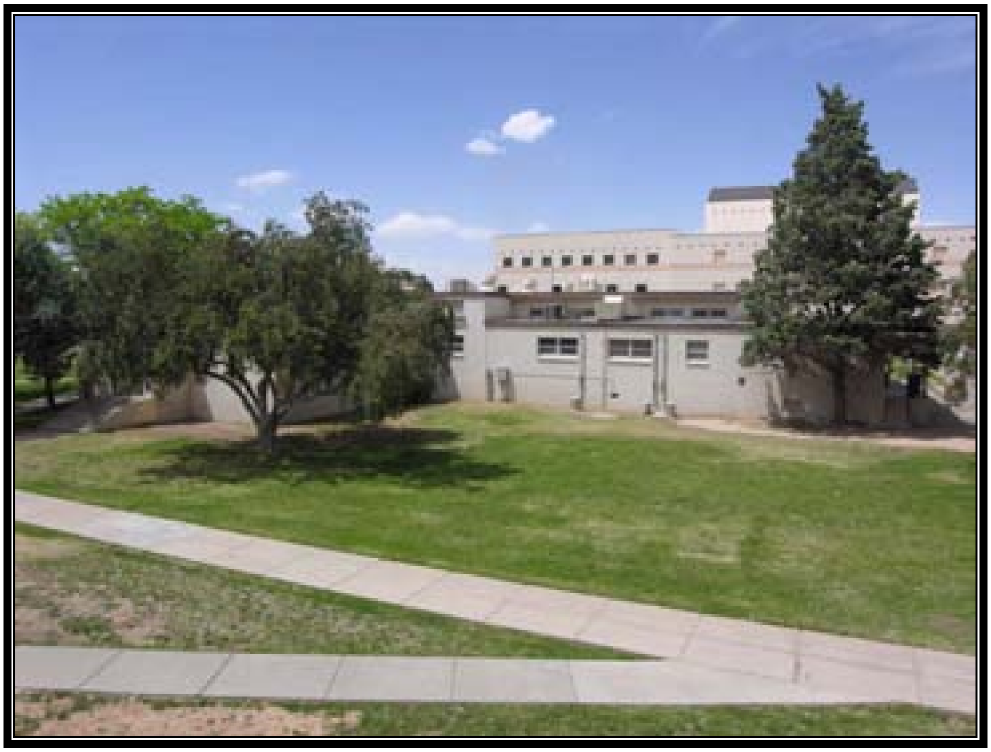

Plate 203 South elevation of Building 426 showing original clerestory (Photograph by RCG&A, 2008)

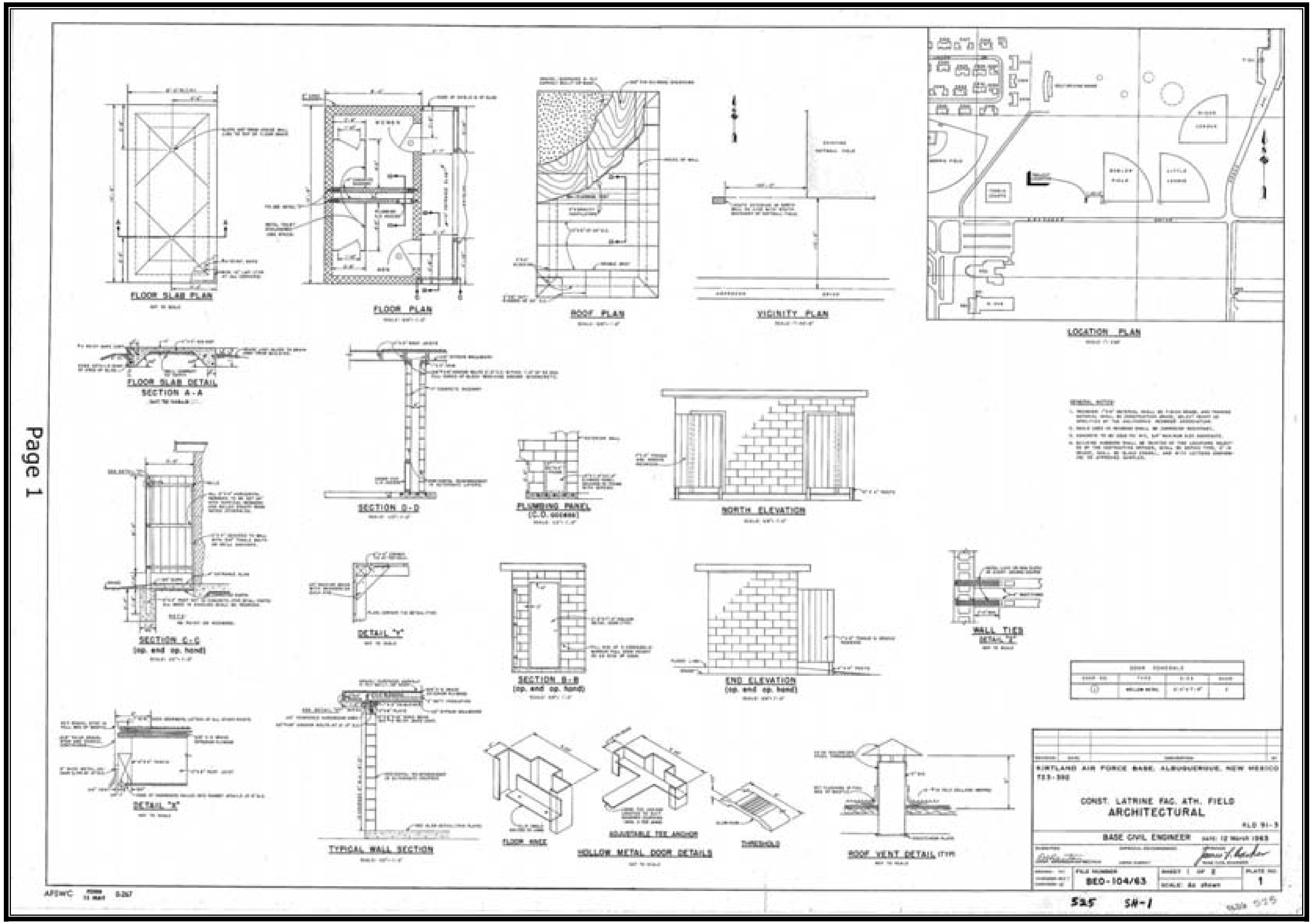

Plate 204 Plans and elevations for Building 525 developed in 1963 (Courtesy Kirtland Air Force Base)

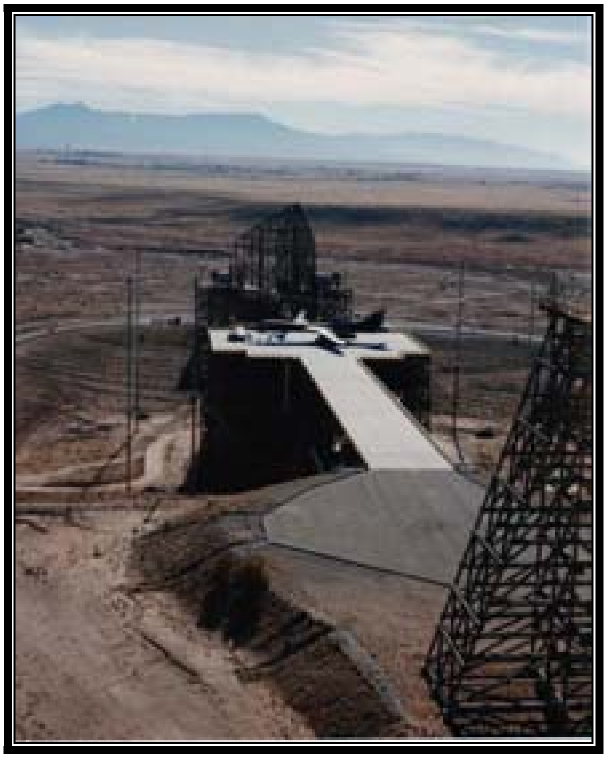

Plate 205 The Trestle with B-1 bomber (Courtesy Kirtland Air Force Base)

Plate 206 The Trestle with B-52 bomber (Courtesy Kirtland Air Force Base)